AMERICA'S LARGEST TEXTILE MONTHLY

COTTON

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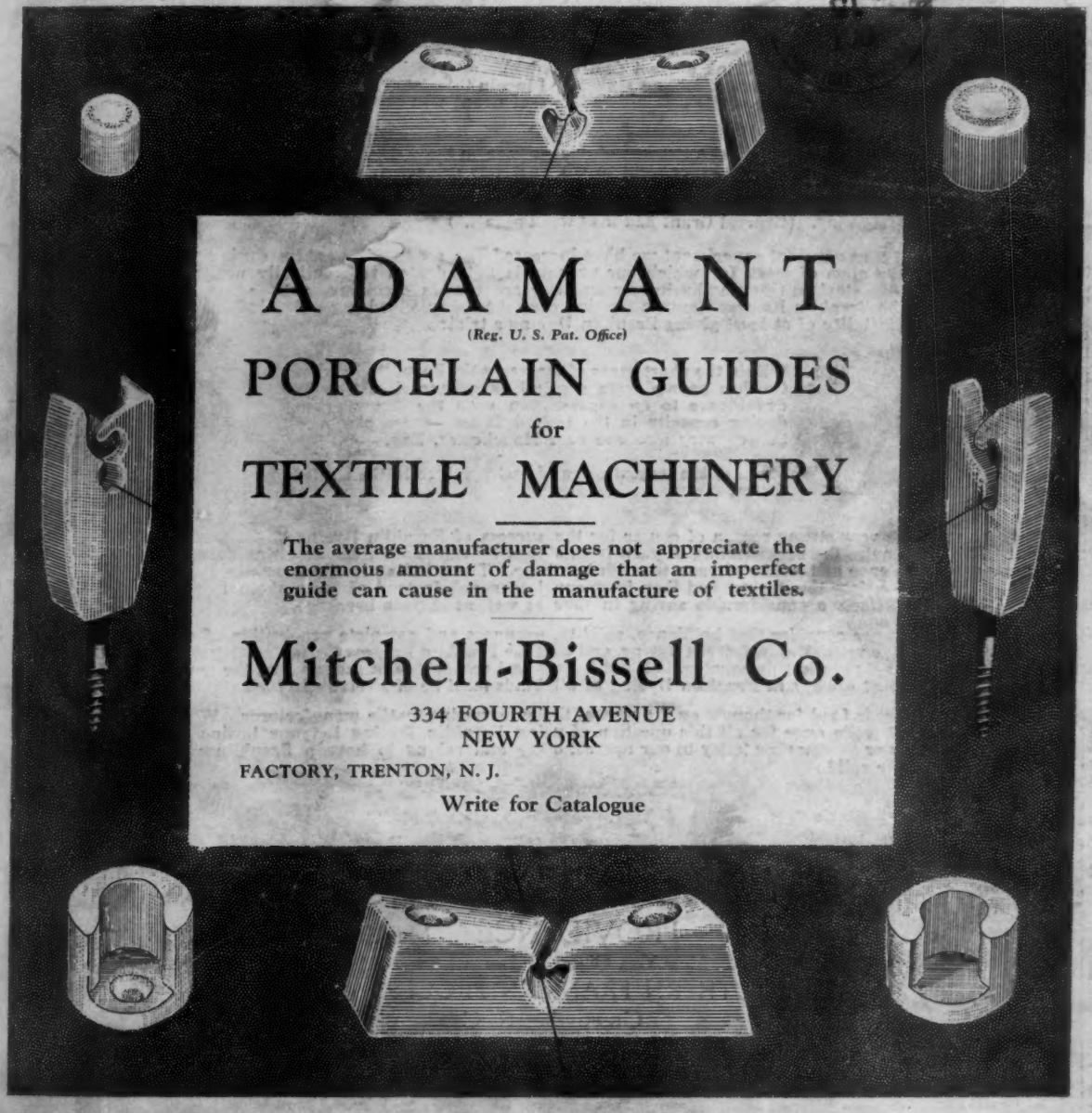

ADAMANT
(Reg. U. S. Pat. Office)
PORCELAIN GUIDES
for
TEXTILE MACHINERY
The average manufacturer does not appreciate the enormous amount of damage that an imperfect guide can cause in the manufacture of textiles.
Mitchell-Bissell Co.
334 FOURTH AVENUE
NEW YORK
FACTORY, TRENTON, N. J.
Write for Catalogue

GENERAL GRANT, WHISKEY AND FRANKLIN DYEING

WHEN some "well meaning" soul told President Abe Lincoln that General Grant drank a great deal of whiskey, Lincoln suggested that it would be a good idea to order a number of barrels of Grant's brand and send one to each of his other generals.

This was Lincoln's characteristic way of pointing out the fundamental truth that results are what count in this world, that you can't get away from the significance of undeniable facts.

Perhaps Grant did drink a great deal of whisky and perhaps this is not a laudable practice, but to a straight thinking man like Lincoln this detail of Grant's character was insignificant in the face of the undeniable fact that Grant was getting results where other generals had failed.

Undoubtedly the Franklin Process of dyeing yarn in the wound form was not entirely successful in every dyeing experiment to which it was subjected in the early days.

Even today there are some very few classes of work for which we do not recommend Franklin Dyeing. (General Grant had his "weak points.")

But thru constant experiment we have increased the scope of Franklin dyeing until today the class of work for which our process is not adapted is practically negligible. And to the straight thinking business man there are certain dominant, outstanding facts about the Franklin Process Company which cannot be overlooked in passing judgment on the advisability of at least giving Franklin Dyeing a trial:

1. **Within the short space of ten years the Franklin Process Co. has grown from a small experimental station in Providence to an organization with the largest yarn dyeing capacity in the United States,—three plants in this country also one near Manchester, Eng.**

We are also the largest users of fast vat dyes in the United States.

One very strong reason of course for the success of Franklin Dyeing is the fact that it eliminates the backwinding of yarn from skeins or warps with the resulting delay, inconvenience and waste of yarn through breakage. The winding in the Franklin Process is done before the dyeing, and then from spool to spool, instead of from skein to spool, which effects a considerable saving in time as well as in yarn breakage.

When we consider that brilliance, solidity, evenness and complete penetration of color are prime requisites in fast vat dyeing, and that the Franklin Process Co. is the largest user of fast vat dyes in this country, is it not logical and reasonable to assume that the general average of quality in Franklin Dyeing of all kinds must be of a relatively high standard?

Here is food for thought on the part of the enterprising textile manufacturer. Why do you not settle once for all this question of using Franklin Dyeing in your business by writing or telephoning today to our nearest office and asking to have a Franklin representative call?

FRANKLIN PROCESS CO.

Philadelphia PROVIDENCE Manchester, Eng.

New York Office, 72 Leonard Street

SOUTHERN FRANKLIN PROCESS CO.

Greenville, S. C.

This Is the Time To Look Over Your Spinning Rings

The Vacation Season is past and your help are all back on the job.

The heat of summer no longer requires open windows with disturbance to even humidity and other Spinning conditions.

The period of intense production is ahead.

Gains made now mean increased production through the profitable winter and spring season.

If Spinners Are Handicapped By Worn or Defective Rings

You cannot reasonably expect good yarn or maximum production. Poor warp or filling increases costs in all subsequent processes — Spooling, Warping, Slashing, Weaving.

Reduced production—anything less than the maximum—is an expense modern competition cannot stand.

Draper Mirror Spinning Rings

Trade-Mark Registered U. S. Pat. Off.

Are the best that can be produced in hardness, finish, uniformity and roundness. They are unequalled for durability, being the result of our 54 years of experience as the leading makers of Spinning and Twister Rings.

Let's Talk It Over. Do it Now and Get Results at once.

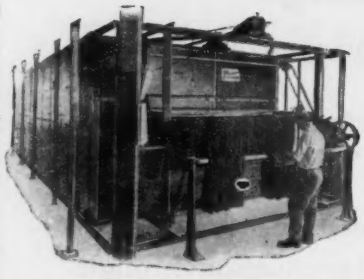
DRAPER CORPORATION

HOPEDALE MASSACHUSETTS

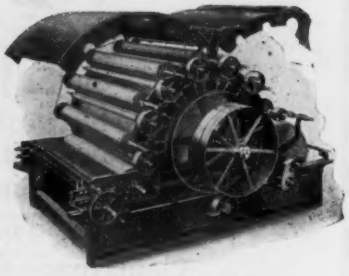
SOUTHERN OFFICE ATLANTA GEORGIA

Copyright 1917 by Draper Corporation

Pioneer Builders of Cotton Dryers, Cotton Waste and Felt Machinery



Automatic Skein Yarn Dryer

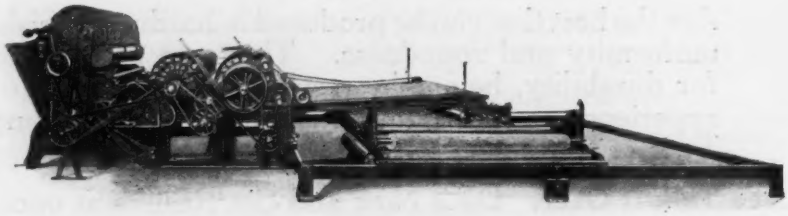


Cotton Waste Card

The first "Proctor" Dryer, built over 35 years ago, marked the beginning of modern drying machinery. Today, "Proctor" Dryers are produced in types best for raw stocks, yarns and fabrics of all kinds. The actual number installed exceeds all other makes.

"Smith-Furbush" Felting Machinery, originated over 30 years ago, now comprises 90% of the cotton felt or batt making equipment used on this continent.

The long popularity of "Smith-Furbush" Carding Machines, Willows, Pickers, Pullers, Shredders, Reclaimers, makes it increasingly evident this company is the pioneer-leader in producing Cotton Drying, Felting and Waste Machinery.



Cotton Felting Outfit

PROCTOR & SCHWARTZ, INC.

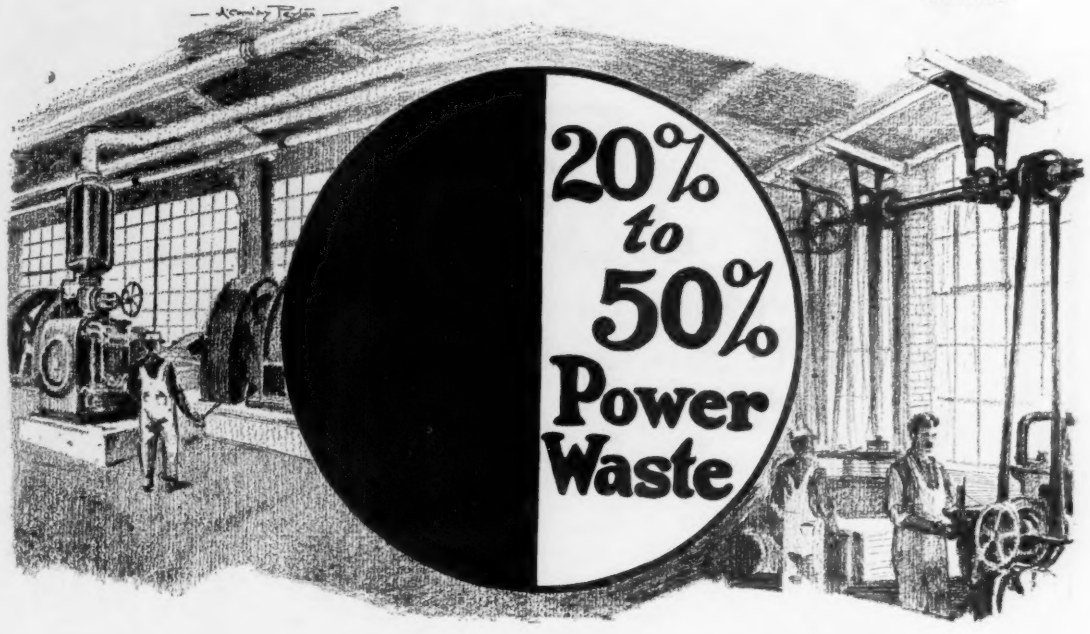
formerly

THE PHILADELPHIA TEXTILE MACHINERY COMPANY

SMITH & FURBUSH MACHINE COMPANY

PHILADELPHIA, PA.

Made Under
SKF
Supervision



20 to 50% of Your Power Is Wasted

Before It Gets to the Earning Part of Your Plant

DO you realize how much power is wasted in merely "making the wheels go round"—in driving your shafting and counter-shafting preliminary to setting the actual earning part of your plant into useful motion?

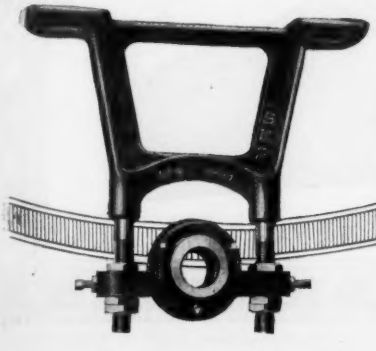
Hundreds of plants are generating power and then wasting 20 to 50 per cent of the total energy on the unproductive shafting and counter-shafting when they should be concentrating their power direct on the earning section of the plant—the machines themselves. And the cause of this power waste is friction—friction which can be practically eliminated by installing Skayef self-aligning ball-bearing drop hangers, post hangers and pillow blocks.

Power transmission appliances of this type are equipped with SKF marked self-aligning ball-bearings which have an extremely low co-efficient of friction and which have the exclusive *inherent* ability of compensating automatically for shaft deflections like a ball and socket joint. Two rows of balls roll practically frictionless between hard races of steel, no wear being noticeable after years of service. As a result bearing adjustments and renewals are unnecessary and as the bearings operate in sealed housings lubricant need only be applied about once every three or four months.

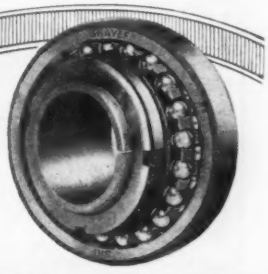
Let Skayef self-aligning ball-bearing hangers stop the theft of energy in the non-productive part of your plant, concentrating your energy at the machines themselves. Such a changeover is easily made and will pay for itself in two years, yielding a large dividend thereafter. Let our engineers estimate how much you can save.

For Nearest Distributor, See MacRae's Blue Book

1015



SKAYEF
Self-Aligning
Ball Bearing
HANGERS
(IMPROVED TYPE)



THE SKAYEF BALL BEARING COMPANY
165 Broadway New York City

FAFNIR

If All of Your Cards Were Equipped With Fafnir Self-Aligning Ball-Bearing Boxes

you would obtain these results:—

1. Eliminate the peak starting load.
2. Save power while running.
3. Practically eliminate wear.
4. Facilitate closer setting.
5. Lubricate three times a year.
6. Obtain perfect cleanliness.
7. More uniform operation.

Fafnir Self-Aligning Ball Bearing Boxes for main cylinders and licker-ins are simple, rugged and easy to install on your present cards.

Let us send you a copy of our Industrial Bearings Catalogue.

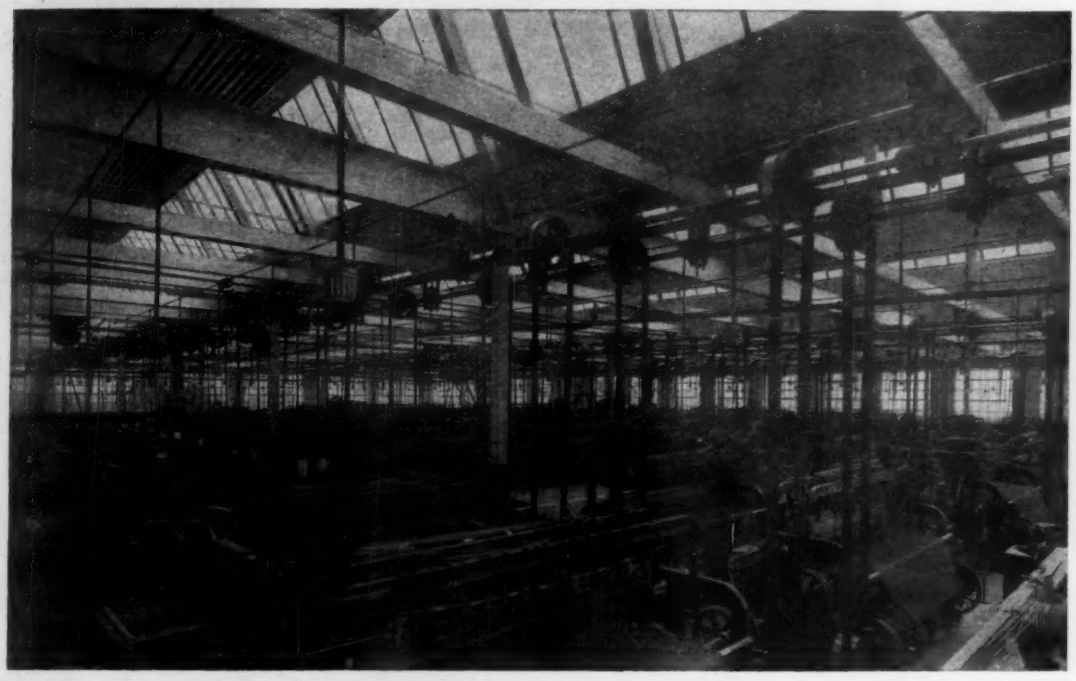
THE FAFNIR BEARING COMPANY
New Britain, Conn.

Southern Representatives

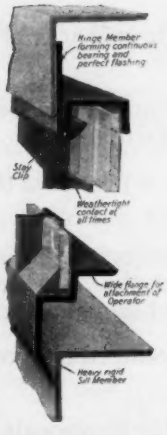
O. R. S. Pool
Box 1375
Greenville, S C.

S. M. Smith
P. O. Box 1423
Greensboro, N. C.

Typical Fafnir Main Cylinder Application



Natural Lighting is One of the Biggest Factors in Mill Planning


Hinge Member forming continuous bearing and perfect flashing
Stay Clip
Weathertight contact at all times
Wide flange for attachment of Operator
Heavy rigid Sill Member

Typical sectional view thru single unit of Truscon Continuous Sash used in sawtooth of Virginia Woolen Mill loom rooms.

Natural daylighting is the principal factor in the design of a textile mill. Artificial lighting is a matter readily handled by a competent illuminating engineer.

In the loom rooms of the Virginia Woolen Mills Co. plant, shown above, Truscon Standard Windows fill the sidewalls. Long runs of fixed Truscon Continuous Sash in the sawtooth monitor flood every loom with abundant light.

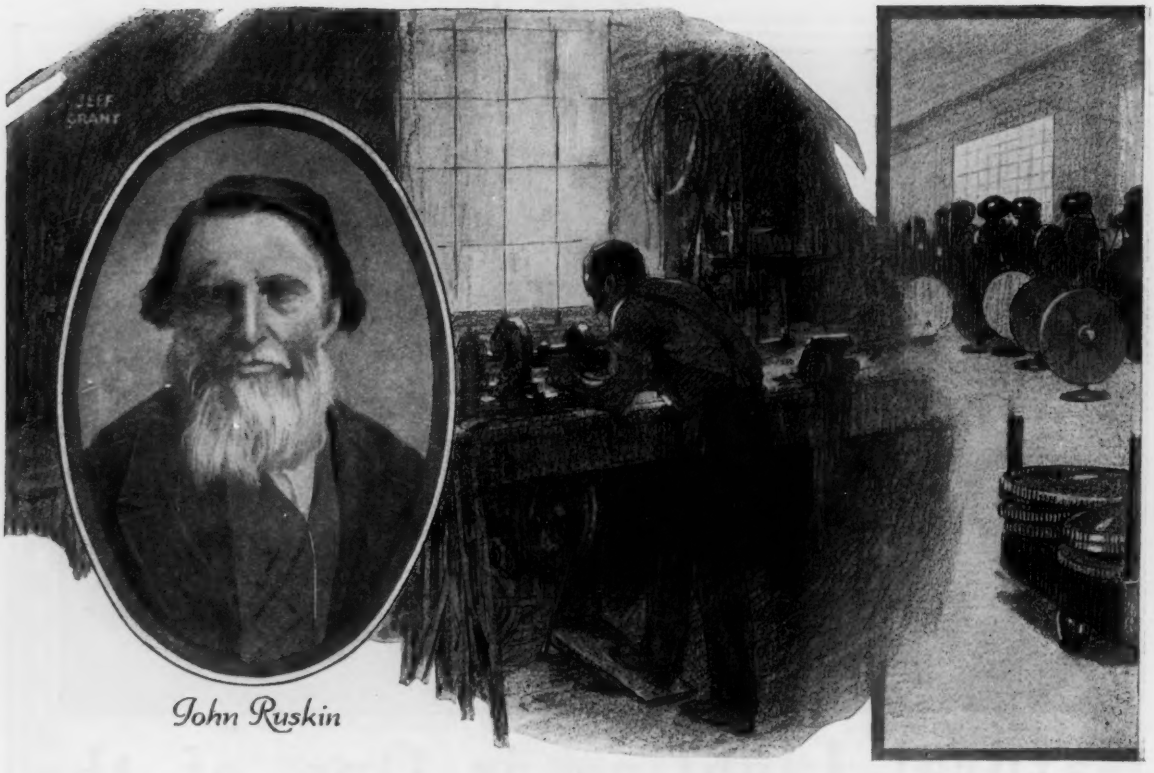
This is only one of hundreds of window arrangements that can be secured. Truscon Windows may be mechanically operated if desired.

Every mill has its particular problem and Truscon daylight engineers are always ready to help you solve them. Years of practical experience in industrial designing makes their service invaluable to you.

TRUSCON STEEL COMPANY
YOUNGSTOWN OHIO

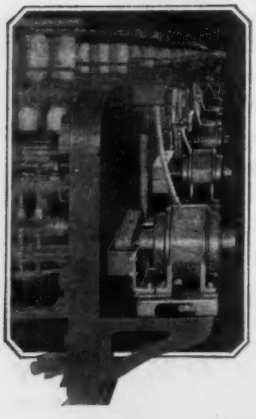
Sales Offices and Warehouses from the Atlantic to the Pacific

TRUSCON STEEL WINDOWS



John Ruskin

John Ruskin –



John Ruskin mistrusted machinery. He said it robbed men and products of *individuality*.

Were Ruskin alive today, his mind could have been changed—not by argument but by performance.

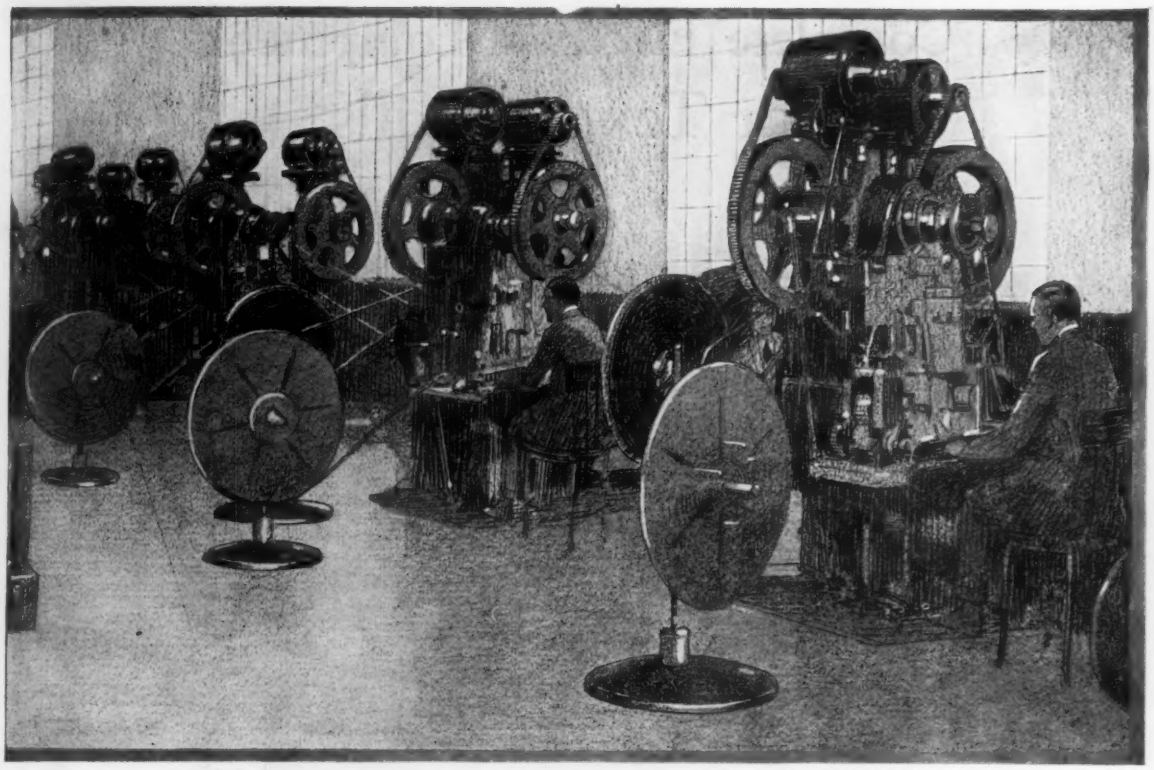
The modern craftsman is responsible for products that would be a credit to any era.

Link-Belt craftsmen are the kind of workers, and Link-Belt Silent Chain is the kind of product, that Ruskin—the original disciple of quality—would have admired.

Link-Belt Silent Chain could not be produced by workers lacking in individuality.

Silent Chain is a brain-built product. It appeals to respecters of *individuality* in *design* and *manufacture*.

LINK-BELT



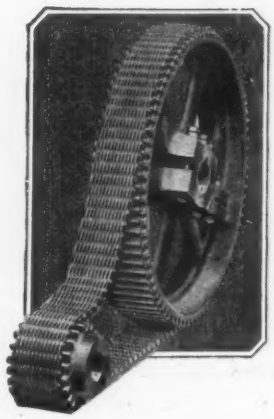
And Today!

The natural results of its use in power transmission are savings and profits.

Link-Belt experience, pride of product and *know-how*, are yours for the asking. If you want *all the power deliverable*, no matter what kind of plant you operate or the problems you face, write us.

The Link-Belt Silent Chain Drive seeks *tests*.

Learn more about this effective, quiet drive for all kinds of machinery and line shafting. Send for our 144-page Link-Belt Silent Chain Drive Book No. 125.



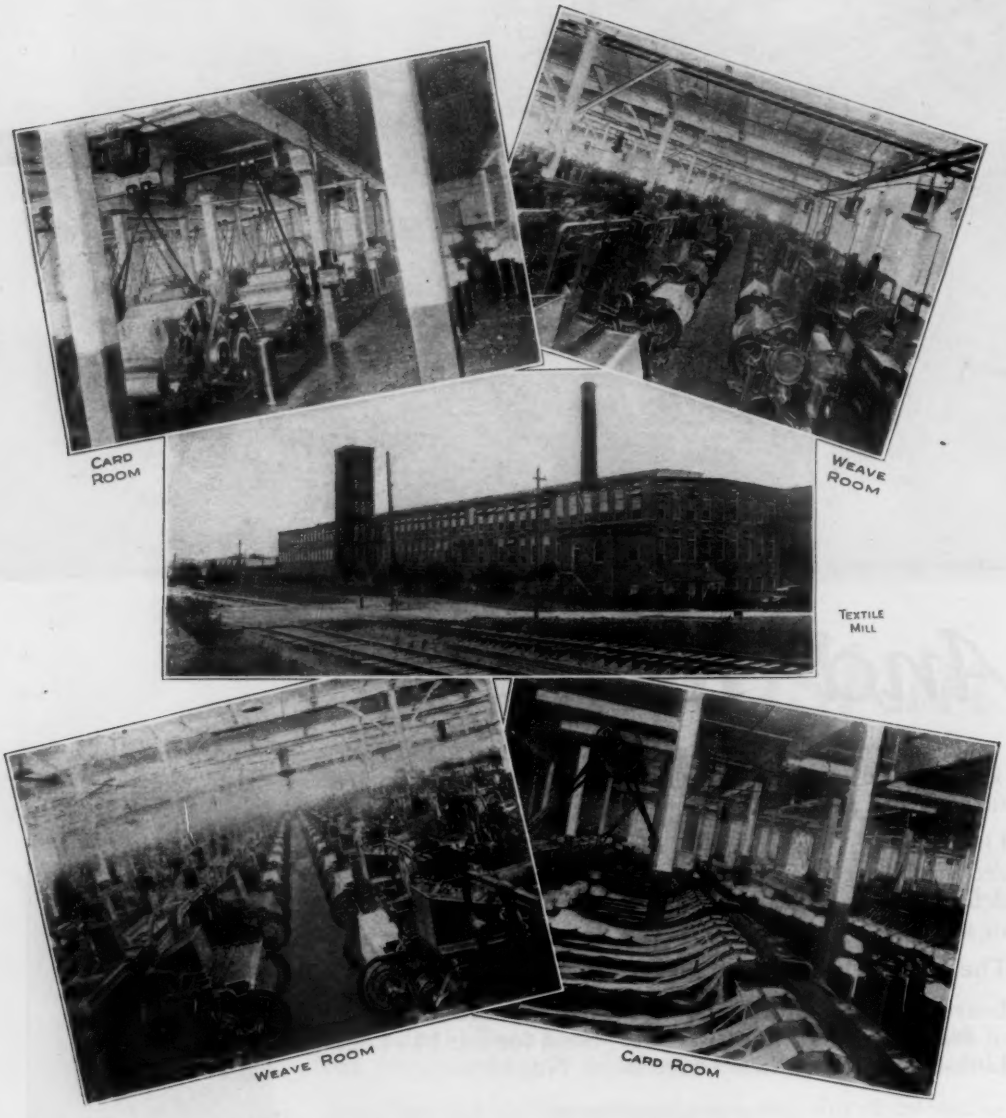
LINK-BELT COMPANY

PHILADELPHIA		CHICAGO		INDIANAPOLIS	
New York	Woolworth Bldg.	Cleveland	429 Kirby Bldg.	Denver	Lindrooth, Shubart & Co., Boston Bldg.
Boston 9	49 Federal St.	Detroit	4210 Woodward Ave.	Louisville, Ky.	Frederick Wehle, 321 Starks Bldg.
Pittsburgh	535 Fifth Ave.	Kansas City, Mo.	906 Elmhurst Bldg.	New Orleans	C. O. Hinz, 504 Carondelet Bldg.
St. Louis	Central Nat'l Bank Bldg.	Seattle	820 First Ave., S.	Birmingham, Ala.	S. L. Morrow, 720 Brown-Marx Bldg.
Buffalo	745 Ellicott Square	Portland, Ore.	101 First St.	Charlotte, N. C.	J. S. Cothran, Com'l Bank Bldg.
Wilkes-Barre	2d Nat'l Bank Bldg.	San Francisco	166 Second St.	Canadian Link-Belt Co., Ltd.	
Huntington, W. Va.	Robson-Prichard Bldg	Los Angeles	168 N. Los Angeles St.		Toronto and Montreal

H. W. CALDWELL & SON CO., CHICAGO NEW YORK, Woolworth Bldg. DALLAS, TEXAS, 709 Main St.

SILENT CHAIN

Complete Electrical Equipment For Textile Mills



Allis-Chalmers equipment for textile mills includes power equipments of every type as well as auxiliary electrical apparatus, a full line of textile motors for group or individual drive, centrifugal pumps, air compressors, transmission machinery etc.

Send for new Bulletin "Power Equipment for Textile Mills"

ALLIS-CHALMERS PRODUCTS
Electrical Machinery
Steam Turbines
Steam Engines
Gas and Oil Engines
Hydraulic Turbines
Crushing and Cement Machinery
Mining Machinery

ALLIS-CHALMERS MANUFACTURING COMPANY

MILWAUKEE, WISCONSIN. U.S.A.

ALLIS-CHALMERS PRODUCTS
Flour and Saw Mill Machinery
Power Transmission Machinery
Pumping Engines-Centrifugal Pumps
Steam and Electric Hoists
Air Compressors - Air Brakes
Agricultural Machinery
Condensers

IN ADDITION to being "easy to wire," Westinghouse Reflector-Socket Fixtures have many features that have popularized them as the ideal type of industrial lighting equipment.

Water-proof, non-corrosive, protected from accidental short circuit, reflector securely and correctly seated, easily cleaned, and interchangeable units are some of the outstanding advantages of Westinghouse Reflector-Socket Fixtures.

"Is our wiring adequate?" is a question that you should first put to yourself and then ask a Westinghouse Interior Lighting Engineer.

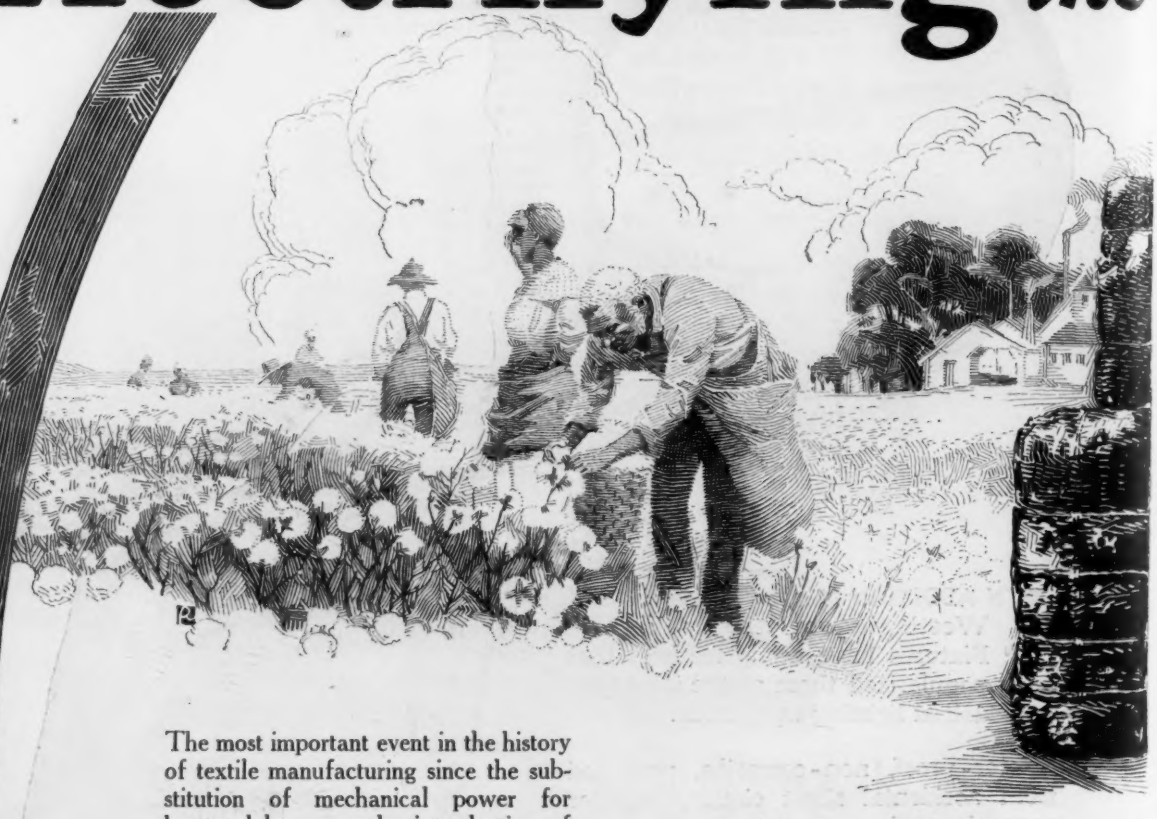
Literature describing the advantages of better lighting will be sent if you write to—

Westinghouse Electric & Manufacturing Company
George Cutter Works South Bend, Ind.

Westinghouse Reflector-Socket with Standard RLM Dome Reflector

Westinghouse

Electrifying *the*



The most important event in the history of textile manufacturing since the substitution of mechanical power for human labor, was the introduction of individual motor drive.

The application of alternating current and the alternating current induction motor to the textile industry were Westinghouse ideas. They alone made complete electrification of the textile industry possible.

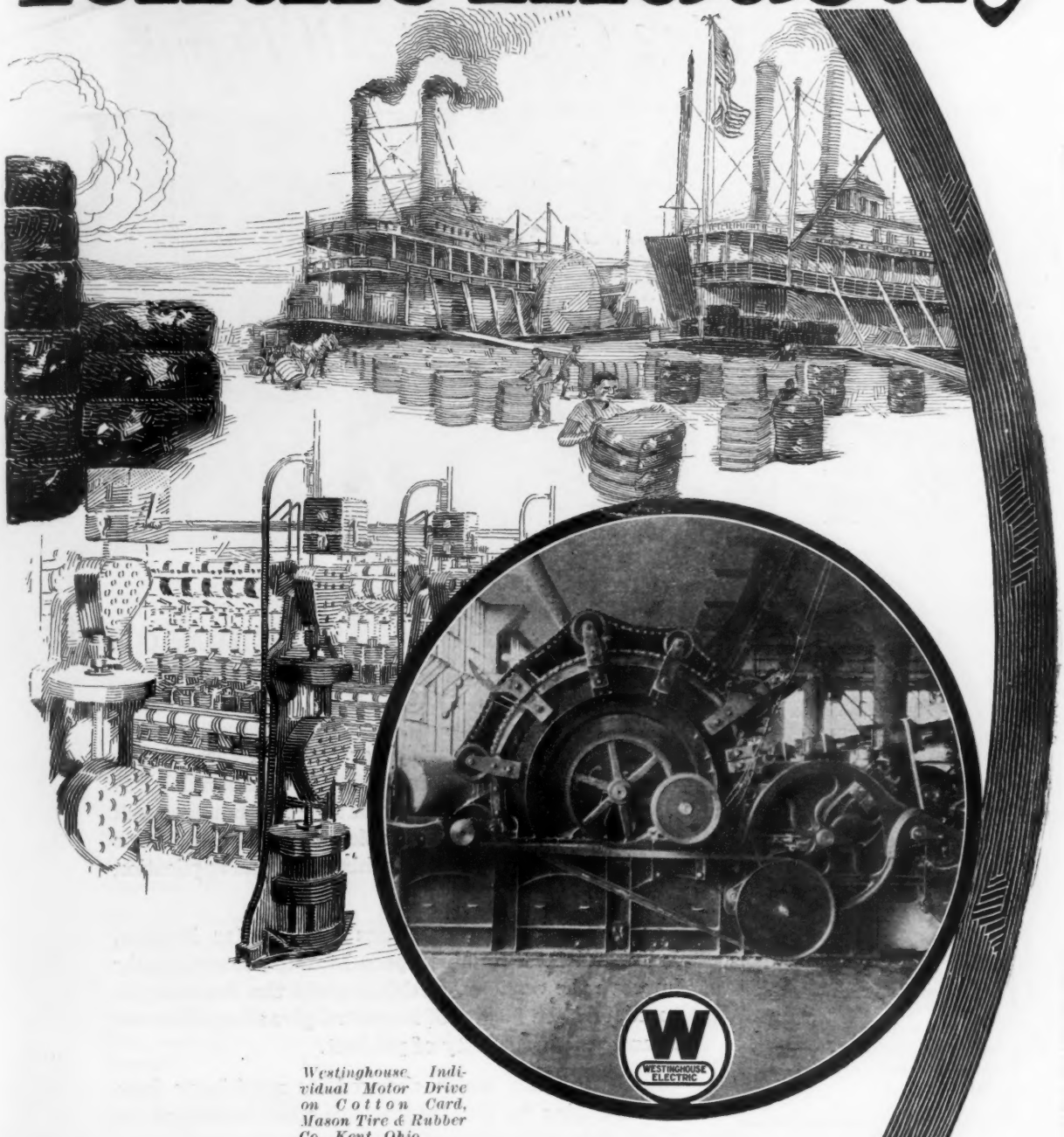
It was the Westinghouse Company that first appreciated the value of individual motor drive in the textile industry. While other manufacturers were advocating group drives, Westinghouse engineers were engaged in an extensive study of the advantages of individual motor drive. The first large installation of individual textile motors was made in 1902 at the plant of the Sauquoit Silk Company, Philadelphia, by the Westinghouse Company. The individual motor drive has proved its superiority over all other methods and its superiority is now universally recognized by textile manufacturers.

Westinghouse Electric & Manufacturing Company

East Pittsburg, Pa.

Westinghouse

Textile Industry

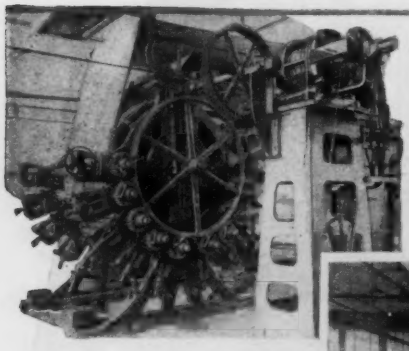


Westinghouse Individual Motor Drive on Cotton Card, Mason Tire & Rubber Co., Kent, Ohio.

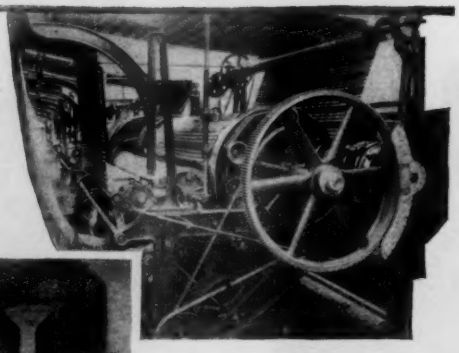
Westinghouse

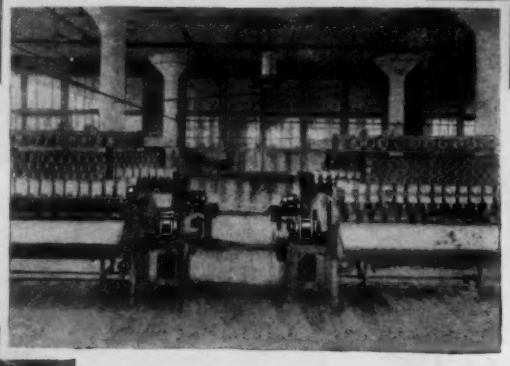
Cotton

Cut Operating Costs At All Points

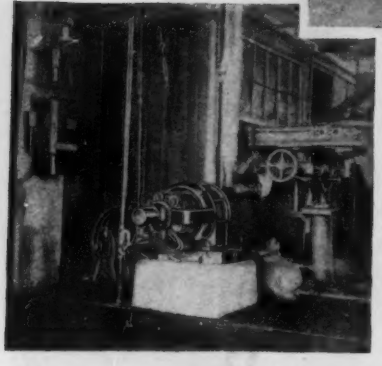


A Motor for Every Machine





The most efficient operation of cloth printing machine and tenter frame is secured by individual drive with a G-E specially designed variable speed a-c. motor and G-E Push Button Controller



Have G-E Motors and Save

In the light of results which are secured through the successful application of individual G-E Motor drive to the many kinds of textile machinery—is it not good mill operating sense to use a suitable individual G-E Motor for each and every textile machine where an application can be made?

For Cloth Printing machines and Tenter Frames, individual G-E Variable Speed Motors always greatly improve the economy of drive, while the flexibility in speed, and the facility of its control give a large increase in and a higher quality of product.

One printworks, which changed its machinery from steam engine to G-E Motor drive acknowledged an increase in production of over 30 percent.

G-E engineers are always at your service in co-operating with you to obtain the maximum production and best quality of products from your machinery.

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

GENERAL ELECTRIC

44-51

Your output depends on your lighting

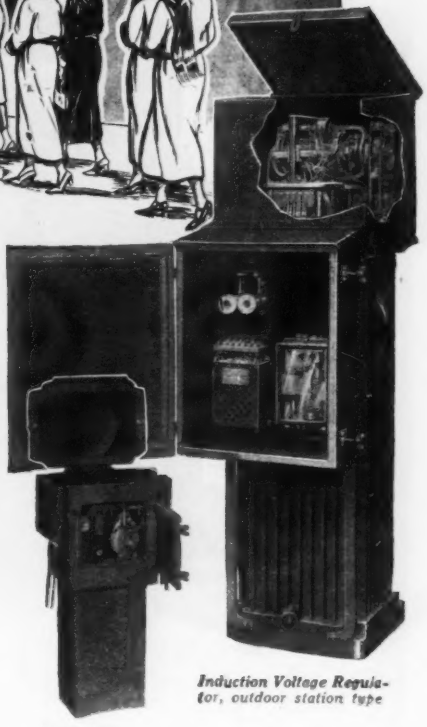
Help your workers produce

Good illumination represents one expenditure which brings the greatest returns for the money invested. It brings: better health conditions, less labor turnover, fewer accidents, better workmanship, and less waste—all of which means increased production.

Good illumination depends on normal voltage as well as on plenty of lamps and properly designed fixtures. In fact the candle-power of MAZDA lamps decreases more than one third, if the voltage falls off only 10%.

You can maintain normal voltage on your lighting circuits by installing G-E Induction Voltage Regulators. Central stations use them for efficient distribution to load centers as well as to give the best service to their lighting customers. Industries install them to provide ideal working conditions on which maximum production depends.

Are you profiting likewise?



Induction Voltage Regulator, outdoor station type

Pole type

General Electric Company
Schenectady, N. Y.
Sales Offices in all Large Cities

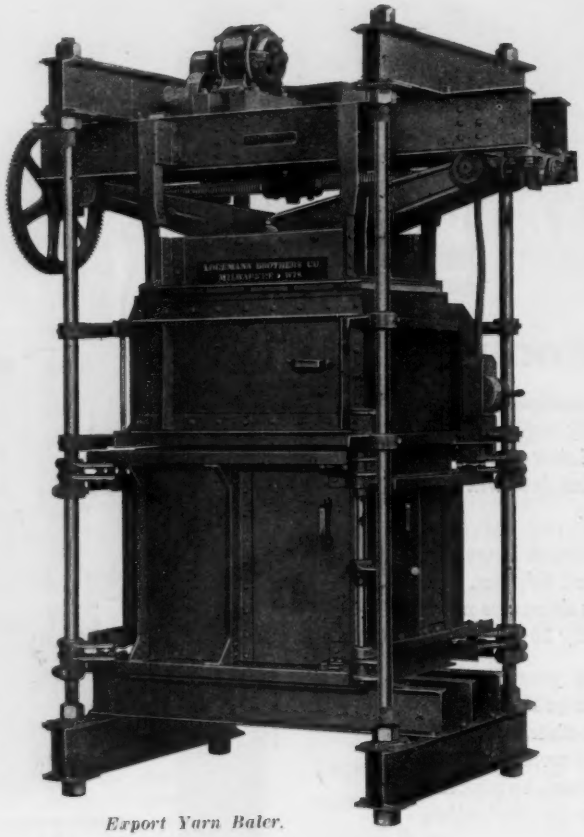
GENERAL ELECTRIC

33B-40

LOGEMANN

Hand - Belt - Electric - Hydraulic

Baling — Presses



Export Yarn Baler.

FROM year to year, hundreds of new names are added to the list of *LOGEMANN* baling-press users in the textile field.

Every year, repeat orders from users of *LOGEMANN* baling-presses increase steadily, denoting the satisfaction derived from this equipment.

BUT —

Until every mill-owner, superintendent, and operator, is familiar with the *LOGEMANN* line of balers for yarn, waste and finished goods, our advertising has not accomplished its purpose.

We solicit your inquiries.

LOGEMANN BROTHERS CO.

Main Office & Works - Milwaukee, Wis.

White heavy duty trucks in the service of Cooper & Griffin, Greenville, S. C.

White Trucks

The merit of a motor truck lies in its ability to do the most work at the least cost for the longest period of time.

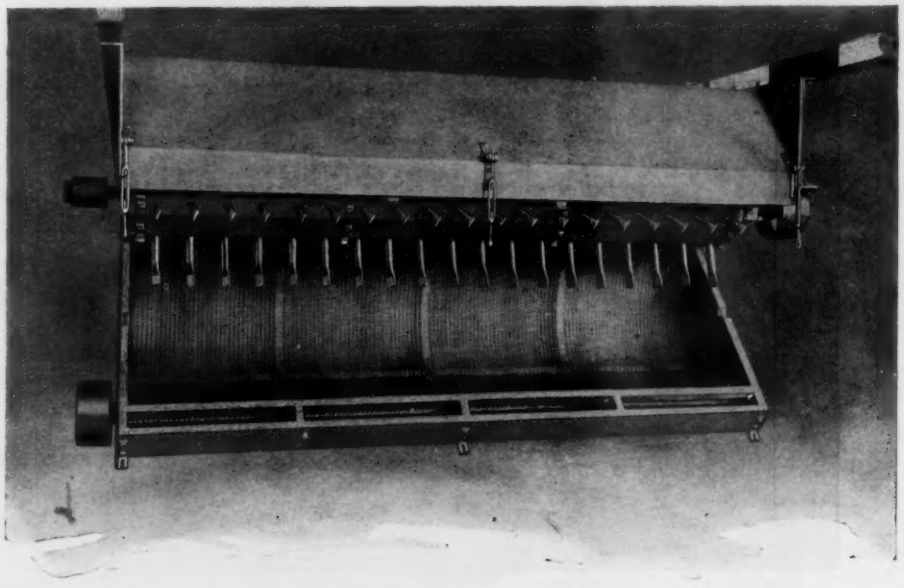
Quality **is essential to profitable operation. There is no place in truck economy for an inferior truck** ***at any price.***

White Trucks have the ***quality*** **that is reflected in volume of performance and high earning power.**

THE WHITE COMPANY

Cleveland

22 YEARS OF KNOWING HOW



Put Your Conveyor Pipe to Work

You can give your cotton a thorough cleaning, opening and aerating, while it's being conveyed from the bale breakers to the picker room. The Murray Cotton Cleaning and Aerating Machine forms a part of the conveyor pipe, and vastly improves the stock before it is fed to the pickers.

The "Murray" takes up very little extra space, since it can be hung from the ceiling. Its supply of cotton is drawn through it by the suction of the conveyor pipe fan, no additional fan or increased draft being necessary. A further economical feature is the fact that the "Murray" requires practically no attention since the dirt is automatically disposed of through a chute at one end.

Handles 2,500 Lbs. Hourly.

2,500 pounds of cotton per hour can be cleaned, opened and aerated in the Murray machine at a power expenditure of only 3 to 5 H.P. The stock is given a thorough treatment by 114 revolving arms.

The Bowling Green Spinning Mills write us stating "The Opener we purchased from you is giving entire satisfaction in every way. In fact we think it is a wonderful machine."

THE MURRAY COMPANY, ATLANTA, GA.

Northern and New England Sales Representatives:
Aldrich Machine Works
P. O. Box 132, Providence, R. 1

Carolina Sales Representatives:
Carolina Specialty Co.
Brevard Court
Charlotte, N. C.

The Murray (PAT. PENDING)

COTTON CLEANING AND AERATING MACHINE

COTTON WELL OPENED IS HALF SPUN

HOCKADAY WINS AGAIN!

THESE TESTS MADE BY THE AMERICAN TOOL WORKS CO. AT THEIR PLANT

FIRST COAT - 1/2 GAL.

SAMPLE NO.	SQUARE FEET.	HOW WORKED.	TIME (MIN.)
1	180	Fairly good	52
2	152	Tough	58
Hockaday	214	Very good	46
4	176	Fairly good	53
5	168	Very tough	68
6	164	Fairly good	52
7	168	Tough	59
8	164	Tough	58
9	168	Tough	62
10	168	Fairly good	53
11	165	Tough	58

SECOND COAT - 1/4 GAL.

SAMPLE NO.	SQUARE FEET	HOW WORKED.	TIME (MIN.)
1	76	Fairly good	33
2	72	Tough	30
Hockaday	108	Very good	20
4	64	Fairly good	34
5	60	Very tough	32
6	68	Fairly good	36
7	68	Tough	31
8	84	Tough	33
9	68	Fairly good	31
10	84	Tough	28
11	70	Tough	30

Requires 10% Less Time to Apply

Covers 25% More Surface

The American Tool Works Co., Cincinnati, did not guess—they took no one's word. Instead they got the facts. In the open market they secured enough paint of the leading brands to make a test. Hockaday won! Their report shows that Hockaday covered 25 per cent more surface in 10 per cent less time. Let us show you how to get the money saving facts. Write us.

THE HOCKADAY COMPANY
1823-1829 Carroll Avenue,
CHICAGO
O. H. Johnson, Mgr., Southern Office, Newberry, S. C.

Don't class Hockaday with "ready-mixed" paints. It's different. Hockaday comes in two parts. Body—a paste, and Reducer—a liquid.

HOCKADAY

THE WASHABLE PAINT FOR ALL INTERIORS

Tennessee-The Heart

The Tennessee E

art of Industrial America

The Logical Location to Reach the World's Markets

Tennessee stands out today as the logical location for an industrial enterprise to reach the big market centers of this country and the world. Embracing 42,000 square miles of territory, it is a region wealthy in vast natural resources. Within a radius of 500 miles, as indicated in the accompanying map, is a population of 42,000,000 people—more than 40 per cent of the population of the entire country.

Five great railroad trunk lines span the state together with several smaller roads and adequate water transportation is afforded by the Mississippi, Tennessee and Cumberland rivers. In this strategic position and with these transportation facilities, Tennessee's industries can readily and economically market manufactured products out of competition with northern and eastern producing centers.

Situated half-way between the Atlantic seaboard and the Gulf, the tremendous and ever increasing markets of the South and Middle West together with the profitable markets of Central and South America are available by the shortest rail and water routes. Through the Panama Canal west coast ports, China, Japan and the markets of the Far East are readily accessible.

These factors together with additional advantages in the way of close proximity to leading cotton centers, an abundance of contented and intelligent native labor, ideal year-round climate and ample electric power facilities make Tennessee the logical location for the establishment of new textile enterprises.

FIVE ADVANTAGES IN TENNESSEE

1. Ideal climate the entire year.
2. Raw materials of all kinds in abundance.
3. Market facilities — unsurpassed rail and water transportation.
4. Ample supply of intelligent and stable labor.
5. Continuous and reliable electric power at low cost.

Full information furnished interested manufacturers upon application.

THE TENNESSEE ELECTRIC POWER CO.
CHATTANOOGA, TENNESSEE

Electric Power Co-

50 Years' Success

1873 1923

Spinning Rings Twister Rings
Silk Rings Traveller Cleaners
Traveller Cups GuideWireSets

The Best That Experience Can Produce-That Money Can Buy

Whitinsville Spinning Ring Co.
Whitinsville, Mass.

GEORGIA

The State Made to Order for Industry

WITH an abundant supply of hydro-electric power; transportation facilities to meet rigorous requirements; advantageous industrial locations; plentiful labor; incomparable climatic conditions and educational facilities of high type—Georgia is an ideal industrial state.

Visit Our Booth *at the* International Textile Show

BOSTON

Oct. 29 to Nov. 3, 1923

SEE our hydro-electric developments reproduced in graphic bas-relief and get from our representatives all the facts about the state of Georgia and what it has to offer industry.

Our hydro-electric developments, now actually under way, will increase the Company's deliverable output 134 per cent—from 272,000,000 kilowatt hours a year to 635,000,000 kilowatt hours. Early in 1924 140,000,000 kilowatt hours of this increase will be deliverable.

For further information see our representatives or write

Georgia Railway & Power Co.

Atlanta

WAGES AND RESULTS

The wages paid to labor and the production received from labor are important elements in determining the location of a textile mill.

Consider the following figures from Seaboard territory.

Classes of labor picked at random.

Spooler Tenders—Female

Alabama	11.41
Georgia	11.86
North Carolina	14.76
South Carolina	10.95

Weavers—Male

Alabama	14.23
Georgia	16.01
North Carolina	19.27
South Carolina	15.72

Compare these wages with results:

	Average weekly wages—all hands	Cotton consumed per spindle: pounds
Alabama	$12.41	135.58
Georgia	13.60	138.49
North Carolina	15.23	104.32
South Carolina	13.35	76.70

Southern labor produces practically 100 per cent more per spindle than Northern labor.

Address

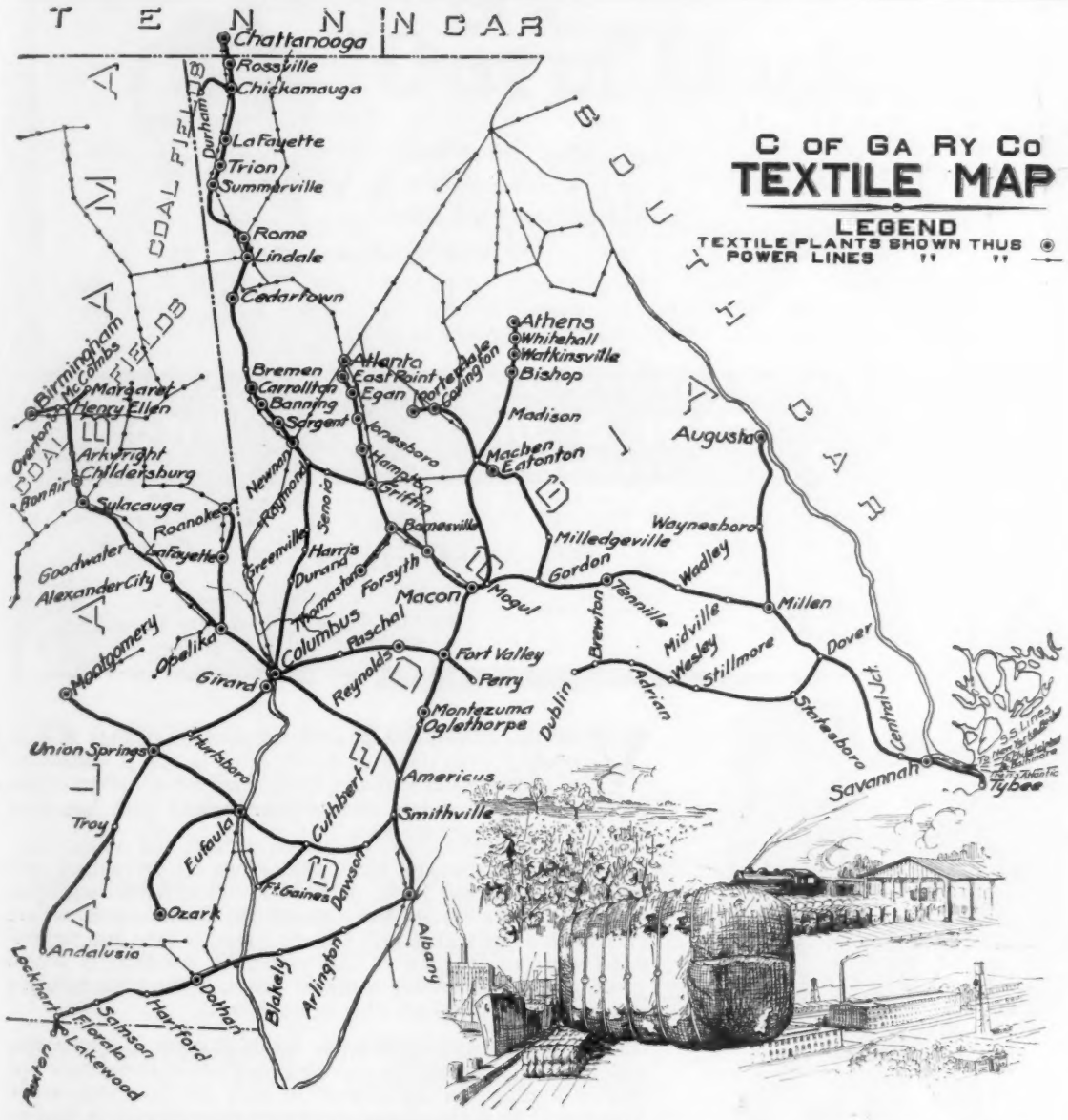
Chas. A. McHeard
General Industrial Agent,

SEABOARD AIR LINE RAILWAY

Oglethorpe Building **Savannah, Georgia**

THE SEABOARD—THROUGH THE HEART OF THE SOUTH

Logical Location for Textile Industries



Georgia has 201 textile plants, of which 115 or 57% are in cities served by the Central of Georgia.

Alabama has 74 textile plants, of which 27 or 36% are in cities served by the Central of Georgia.

The fact that these are successful, going concerns is convincing evidence that they are properly located.

This territory being supplied with hydro-electric power in ample quantity, and with nearby coal fields of Alabama and Tennessee, the question of power is fully solved.

While other essential requirements, such as labor, climate, adequate transportation and nearness to raw materials all combine to enable the Central of Georgia territory to offer those establishing new mills a location that is ideal and of proven value.

Further and detailed information will be gladly furnished upon request.

J. M. MALLORY, General Industrial Agent

CENTRAL OF GEORGIA RAILWAY

Savannah, Georgia

WILLIS A. SUTTON, SUPERINTENDENT · H. REID HUNTER, ASSISTANT SUPERINTENDENT · MARY W. POSTELL, ASSISTANT SUPERINTENDENT · R. L. McCULLOUGH, BUSINESS MANAGER

OFFICE OF
BOARD OF EDUCATION
AND
SUPERINTENDENT ATLANTA PUBLIC SCHOOLS
ATLANTA, GA.

Southern Theatre Equipment Co.,
100 Walton St., Atlanta, Ga.

Gentlemen:--Regarding the educational value of the motion picture in public schools, I wish to call your attention to the following points:

1.--(See previous ad.)

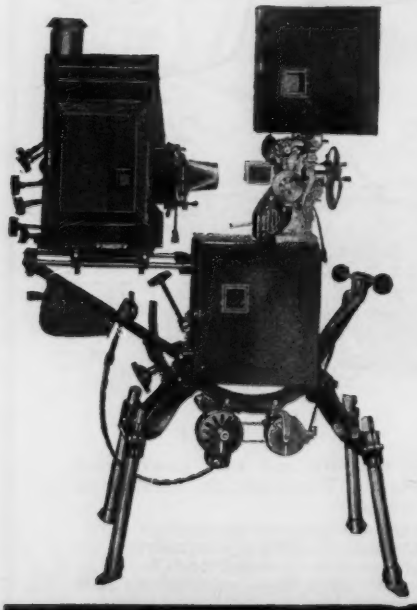
2.--"PICTURES SPEAK A UNIVERSAL LANGUAGE." The impressions they make are direct impressions. Words are mere symbols which must be associated with facts of past experiences before they can be understood fully.

A letter from a man who knows

You may use any or all of this letter as you desire.

Very truly yours,

Joe W. Coffman
Supervisor, Visual Instruction,
Atlanta Public Schools.



VISUAL EDUCATION with the motion picture has already proven its value in city schools, and it will prove of even greater value in village and community schools because it accomplishes even greater results with less time and less experienced teachers.

Through the courtesy of Mr. Coffman, we are presenting each month in paragraph form, parts of a very enlightening letter which he has written us, and through Mr. Coffman also, we are able to give our textile mill friends valuable help and suggestions regarding the use of this system in community school work, the selection of the proper films, in fact the solution of every problem which may present itself.

Our service to textile mills is the result of years of experience, and we have installed Powers Motion Picture Projectors and theatre auditorium equipment in over 60 Southern mills. Whether it be a visual education system or complete motion picture theatre equipment, including screens, chairs, cooling systems, etc., we are ready to take the problem off your hands and turn the system back to you ready for operation.

May we present our special proposition to you?

Southern Theatre Equipment Company

WILLIAM OLDKNOW, President.

100 WALTON STREET
ATLANTA, GEORGIA

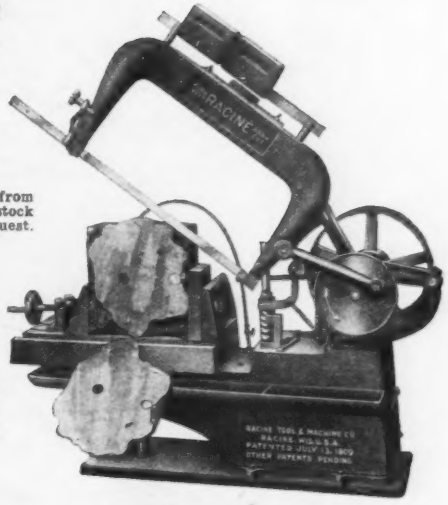
THREE TWENTY-EIGHT CALIFORNIA ST.,
OKLAHOMA CITY, OKLA.

1907 COMMERCE ST.
DALLAS, TEXAS

Taking the "Hack" Out of Hack Saw

Have you examined the accurate work done by this wonderful machine?

Sample cut from 6-in. bar stock sent on request.



RACINE NO. 9 Capacity 12 x 15; 17 to 24 in. blades. Machine is shown cutting an unusually hard meteorite.

RACINE High Speed Cutting Machines have taken the "Hack" out of Hack Saw. They cut with a scientific draw stroke. The positive lift prevents any possibility of the saw dragging on the return stroke. Blades stay sharp and last ten times as long. Cuts are clean, no special attention is required to work the 0.01 inch limits.

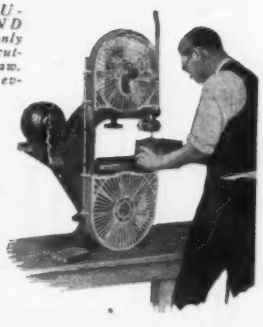
RACINE JUNIOR. A Machine designed for general work. Takes up to 4 in. Cuts with same accuracy as our largest machines.

See Our Exhibit at The International Textile Exhibition in Boston

Let our representative demonstrate savings that can be made with these machines. We are the pioneers in metal cutting machinery and can offer the most complete line of sizes and types.

Complete bulletin sent on request.

RACINE DUPLEX BAND SAW. The only wood and metal cutting band saw. Right speed for every material.



Use "Racine" H. S. wood and metal band saw blades and "Racine" H. S. Tungsten Power and Hand Hack Saw Blades.

The Racine Tool and Machine Co.

1309 Jones Ave., Racine, Wis.

"Standard the World Over"

The Wood Box

1. Reduces Shipping Costs

2. Creates Customer Good-Will

3. The Best Damage Protection Insurance

MANUFACTURERS of textile products, as well as all other manufacturers of today, realize the valuable asset in the good-will of their customers and that any part of their service that is causing dissatisfaction to the customer means a tangible loss in dollars and cents.

The question of shipping containers is one of importance to the textile manufacturer—it is a question of getting your product to the customer in the best possible condition thereby gaining good will for the product and yourself—and it is also a question of saving yourself losses from damage to shipments.

It is significant to note that industry in general is selecting shipping containers that afford the greatest damage protection and are demanding WOOD BOXES. But some shippers are using boxes that are too light, which makes the box liable to break open—others use boxes too heavy which unnecessarily increase freight charges.

Are your goods getting maximum protection at minimum cost? Is your packing expense too great?

HIGHTOWER Wooden Packing Cases have been found the most all-round satisfactory and economical shipping containers possible. The interlocking reinforcement feature makes it possible to use lighter-weight material and the case will carry heavier materials and is harder to pilfer, or break open than others.

Give us the details of your shipments and we will tell you the most economical and satisfactory way of shipping your products.

Hightower Box & Tank Company

ATLANTA, GA. BIRMINGHAM, ALA.

HIGHTOWER

Wooden Packing Cases

Who Pays for Group Insurance

? ? ?

Capital? No!

Earnings are not decreased when Group Insurance is carried

Labor? No!

Wages are not reduced to meet the cost of Group Insurance

Consumer? No!

Prices are not increased by Group Insurance

Group Insurance eliminates waste

Group Insurance pays for itself

THE TRAVELERS INSURANCE COMPANY — Hartford — THE TRAVELERS INDEMNITY COMPANY — Connecticut

L. F. BUTLER, PRESIDENT

THE TRAVELERS

ACCIDENT, LIFE, LIABILITY, HEALTH, AUTOMOBILE, STEAM BOILER, COMPENSATION, GROUP, BURGLARY, PLATE GLASS, AIRCRAFT, MACHINERY

There is a copy of "Group Insurance Data," a portfolio, for each business executive. Drop us a line for yours—on your business letterhead

Stafford bobbin-changing plain goods loom.

Stafford Looms Increase Production

We manufacture a complete line of automatic looms, both shuttle and bobbin-changing for weaving practically every type of fabric that can be made with a single shuttle. ¶ Stafford shuttle-changing looms will handle cop filling just as successfully as bobbin filling. We have a loom for every kind of yarn, coarse or fine, and for practically every variety of fabric, plain or fancy.

THE STAFFORD COMPANY
WEAVING MACHINERY
READVILLE, MASS.

Branch Office
502 Colt Building
Paterson, N. J.

Southern Agent
Fred H. White,
Charlotte, N. C.

Canadian Representative
Whitehead, Emmans, Limited
Montreal

AUTOMATIC
STAFFORD
LOOMS

AUTOMATIC SPOOLER

with Weavers Knotter

HIGH SPEED WARPER

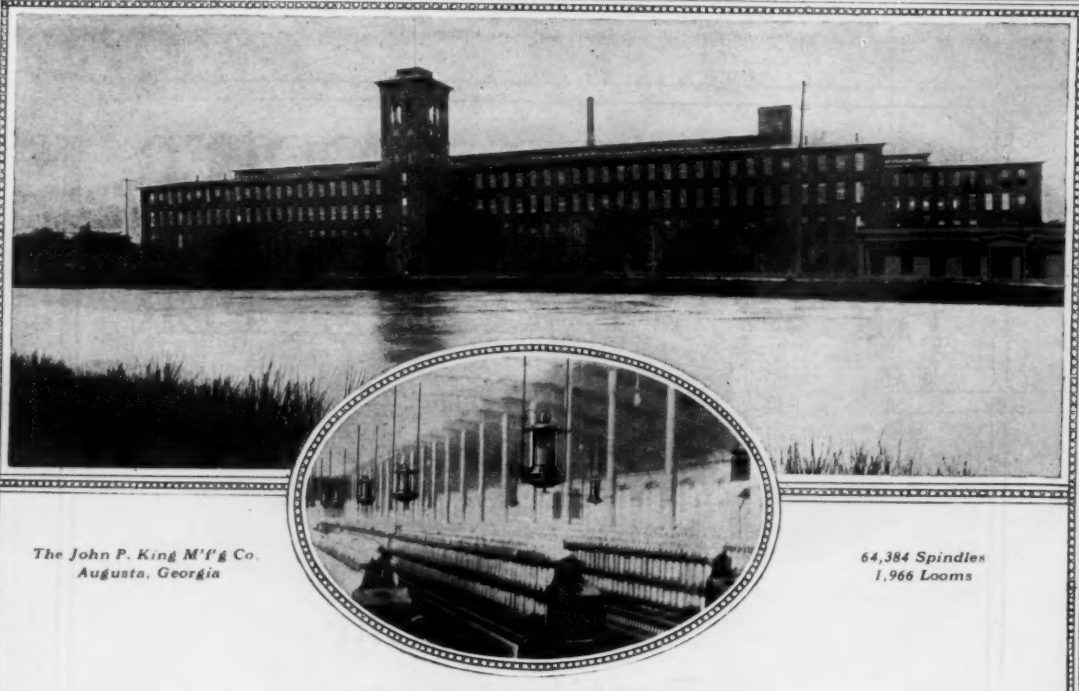
Don't fail to see us at the Textile Show, Boston, October 28th to November 3rd

SPACES 120-125

BARBER-COLMAN COMPANY

Rockford, Ill.

Boston, Mass. Greenville, S. C.



The John P. King M'f'g Co.
Augusta, Georgia

64,384 Spindles
1,966 Looms

Weather Wise

Humidifiers are not intelligent. Some textile processes require 60% relative humidity; some 70%; some 80%. A humidifier is not intelligent enough to know what room it is likely to be working in.

Humidifiers work well or they do not. They are well designed and reliable—or they are not.

Intelligence in humidification comes from designing and making things a little bit better than would sometimes be thought necessary; adding to experiences here and there, profiting by them and passing them along; scrutinizing the problem in hand; engineering and erecting the work with care.

In this mill 147 ParkSpray Electric High-Duty Humidifiers—and 20 ParkSpray Automatic Humidity Regulators insure uniform air conditions.

Some are weather wise—some otherwise.

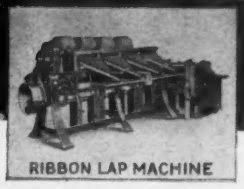
Parks-Cramer Company
Engineers & Contractors
Industrial Piping and Air Conditioning
Fitchburg Boston Charlotte

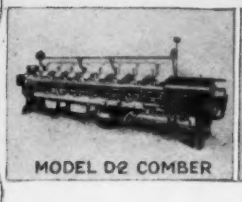
WHITIN MACHINE WORKS

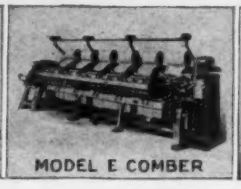
ESTABLISHED 1831

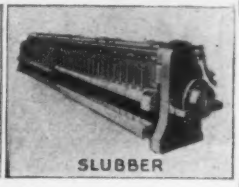
TEXTILE MACHINERY

MAIN OFFICE AND WORKS, WHITINSVILLE, MASS., U.S.A.









Manufacturers of

COMPLETE EQUIPMENTS

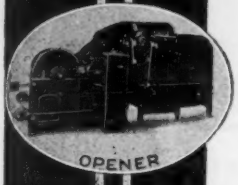
for Making

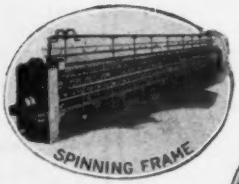
YARNS

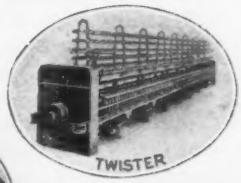
from,

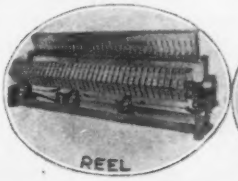
COTTON, COTTON WASTE, WOOL, ASBESTOS, ETC.

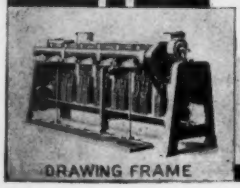
Descriptive Circulars on Request

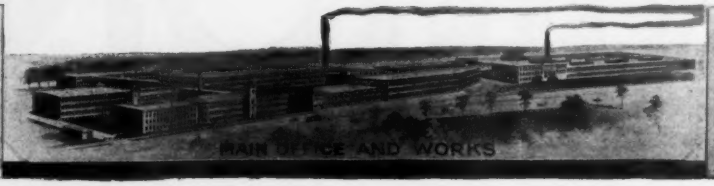




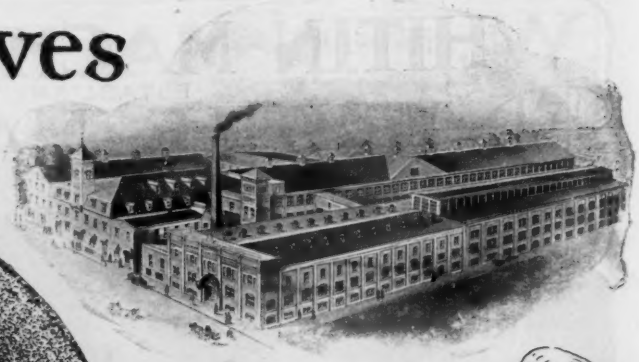








Quality Leaves It's Mark



Emmons

THE name "Emmons" has left its imprint on the textile world as the mark of quality in loom harness and reeds. Cheapness for cheapness' sake has been avoided, but by giving maximum quality at a fair price, the business of this institution has grown until today the Emmons Loom Harness Company is the largest manufacturer of loom harness and reeds in America.

There are few mills in this country who do not use one or more Emmons Products. To these users they need no introduction—their high quality, reliability and serviceability having made a lasting impression.

To the other few who may be seeking better grade products at a fair price, we offer service and satisfaction which they have not experienced elsewhere.

Write "Emmons" on your next order. Write us for prices.

EMMONS LOOM HARNESS CO., LAWRENCE, MASS.
Largest Manufacturers of Loom Harness and Reeds in America
SOUTHERN REPRESENTATIVE: GEO. F. BAHAN.

EMMONS PRODUCTS

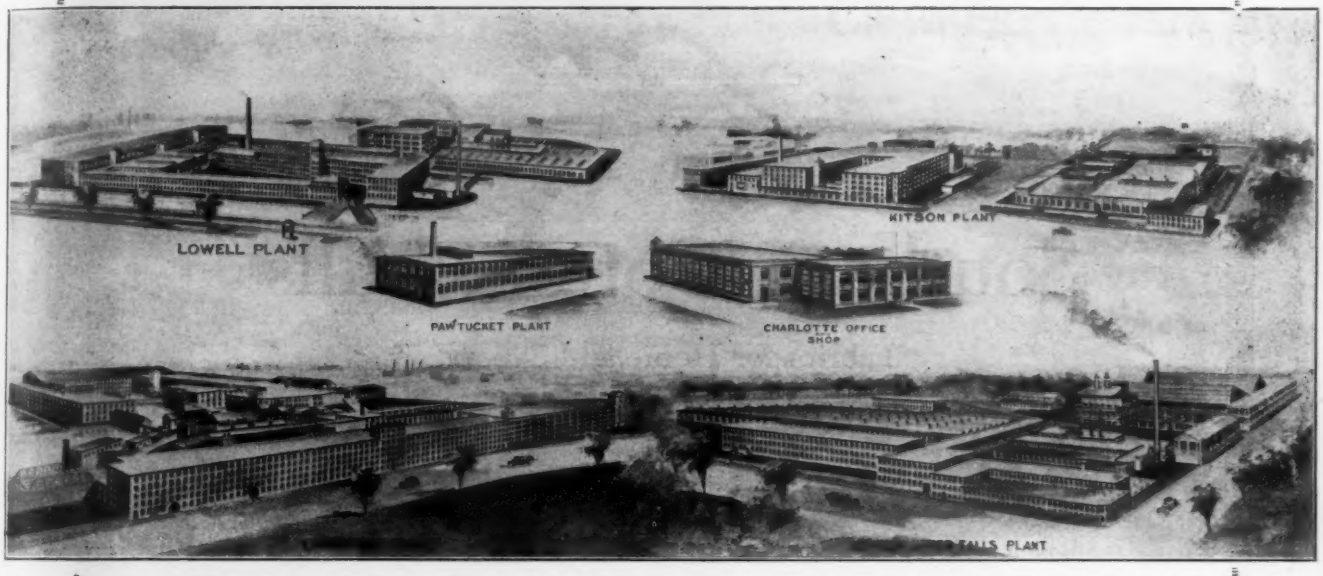
COTTON HARNESS
MAIL HARNESS
SELVEDGE HARNESS
REEDS
SLASHER AND STRIKING COMBS
WARPER AND LIECE REEDS
BEAMER AND DRESSER HECKS
MENDING EYES
JACQUARD HEDDLES, ETC.

Sole Agents for
Wardwell Pickers

EMMONS
LOOM HARNESS AND REEDS

SACO-LOWELL SHOPS

TEXTILE MACHINERY



COMPLETE EQUIPMENTS

OPENING DRAWING WARPERS
CONVEYING ROVING TWISTERS
PICKING SPINNING SLASHERS
CARDS SPOOLERS SPECIALTIES
RINGS SPINDLES FLYERS

Shops at

NEWTON UPPER FALLS AND LOWELL, MASS.
BIDDEFORD, MAINE PAWTUCKET, R. I.

EXECUTIVE OFFICES
BOSTON, MASS.

ROGERS W. DAVIS, Southern Agent, CHARLOTTE, N. C.
Branch Office: GREENVILLE, S. C.

HUNTER
MANUFACTURING & COMMISSION CO.,

58-60 Worth Street New York City

Selling Agents for

Southern Cotton Mills

Fabrics for Home and Export

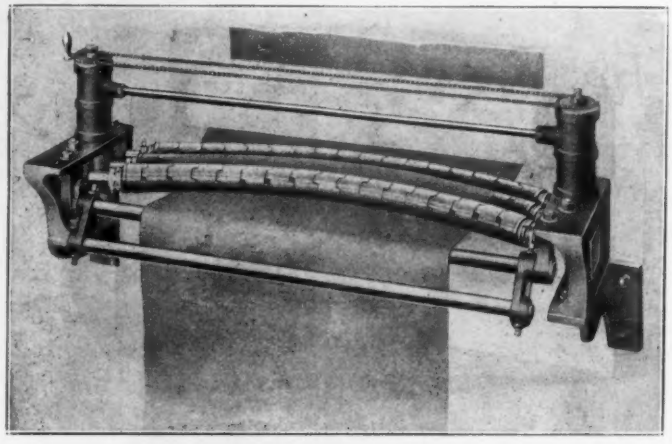
Domestic Branch Offices

Boston Chicago San Francisco Philadelphia
Baltimore St. Louis Greensboro
Cleveland Atlanta Kansas City

Foreign Branch Offices

Buenos Aires, Argentina
Baranquilla, Colombia
Havana, Cuba
San Juan, Porto Rico
Curacao, D. W. I.
Caracas, Venezuela
Manila, P. I.
London, Eng.

SOLE DISTRIBUTORS
to the
JOBBING TRADE
for the
DURHAM HOSIERY MILLS



The MYCOCK *Regulating* Cloth Expanders

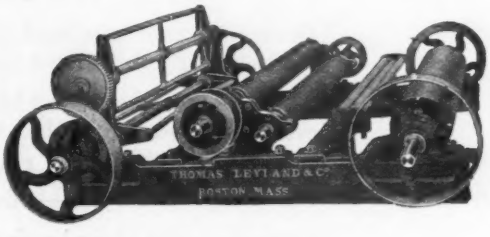
are designed for use with water mangles, starch mangles, dry cans, calenders and mercerizing machines.

The three bar type as illustrated represents the latest improvement in this type of machine and shows the regulating motion and adjustable tension bars. Our experts spared no effort in making this machine the last word in efficient and durable construction.

Improved Free-Running Scutchers

Designed for use in bleacheries, calico print works, piece dye works, woolen and worsted mills this Improved Free Running Scutcher meets the most exacting demands of the textile industry.

It is constructed on the most scientific and approved lines and is fitted with universal bearings throughout. The scrolls are gear driven, but may be equipped with belt drive.



Scutcher is furnished with Single and Double Beaters, Single or Double Rollers as desired. All working parts are interchangeable, therefore easily replaced.

Open your cloth by machine and not by hand.

Write for complete details.

WE WILL WELCOME YOU AT SPACE 32 AND 33 AT THE TEXTILE SHOW OCTOBER 29th TO NOVEMBER 3rd

THOMAS LEYLAND & CO., INC.

F. T. WALSH, Vice-Pres. and Gen'l Mgr.

SOLE MANUFACTURERS

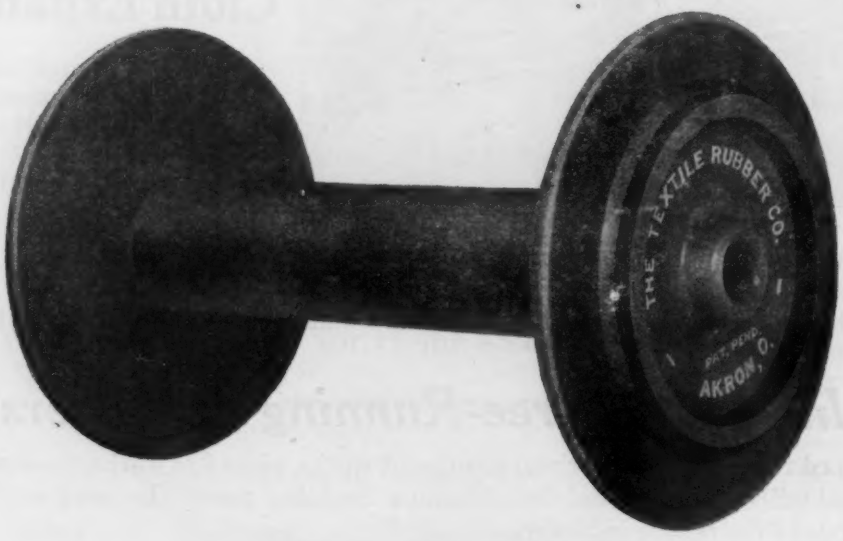
Also Manufacturers of Gums and Dextrines

Office and Works:

READVILLE STATION, BOSTON, 37, MASS.

Branch Office: 80 Wall Street, New York, N. Y.

The First Hard Rubber Spool



Interchangeable WITH WOODEN SPOOLS

The superior qualities of hard rubber makes it the most ideal material possible for perfect textile spools.

It assures a spool that cannot be broken, splintered, bent or dented, even when given the roughest treatment.

It assures a spool with a perfectly smooth finish with no seams or projections to catch the yarn—a finish that will never wear rough.

It assures a spool whose heads will not loosen.

It assures a spool that will never warp, as moisture and climatic conditions have no effect upon it.

Test it yourself, and prove to your own satisfaction that it is the most perfect and economical spool possible.

Samples gladly sent to textile mills on request.

THE TEXTILE RUBBER CO.
225 OHIO BLDG.
Akron, Ohio

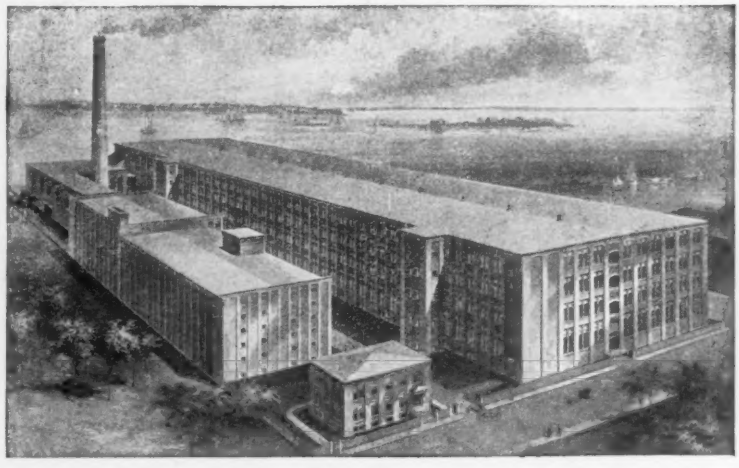
Quissett Mill

New Bedford, Mass.

WILLIAM M. BUTLER
President

EDWARD H. COOK
Treasurer

THOMAS F. GLENNON
Agent



COTTON YARNS

Our Carded and Combed Yarns are spun in all numbers and description.

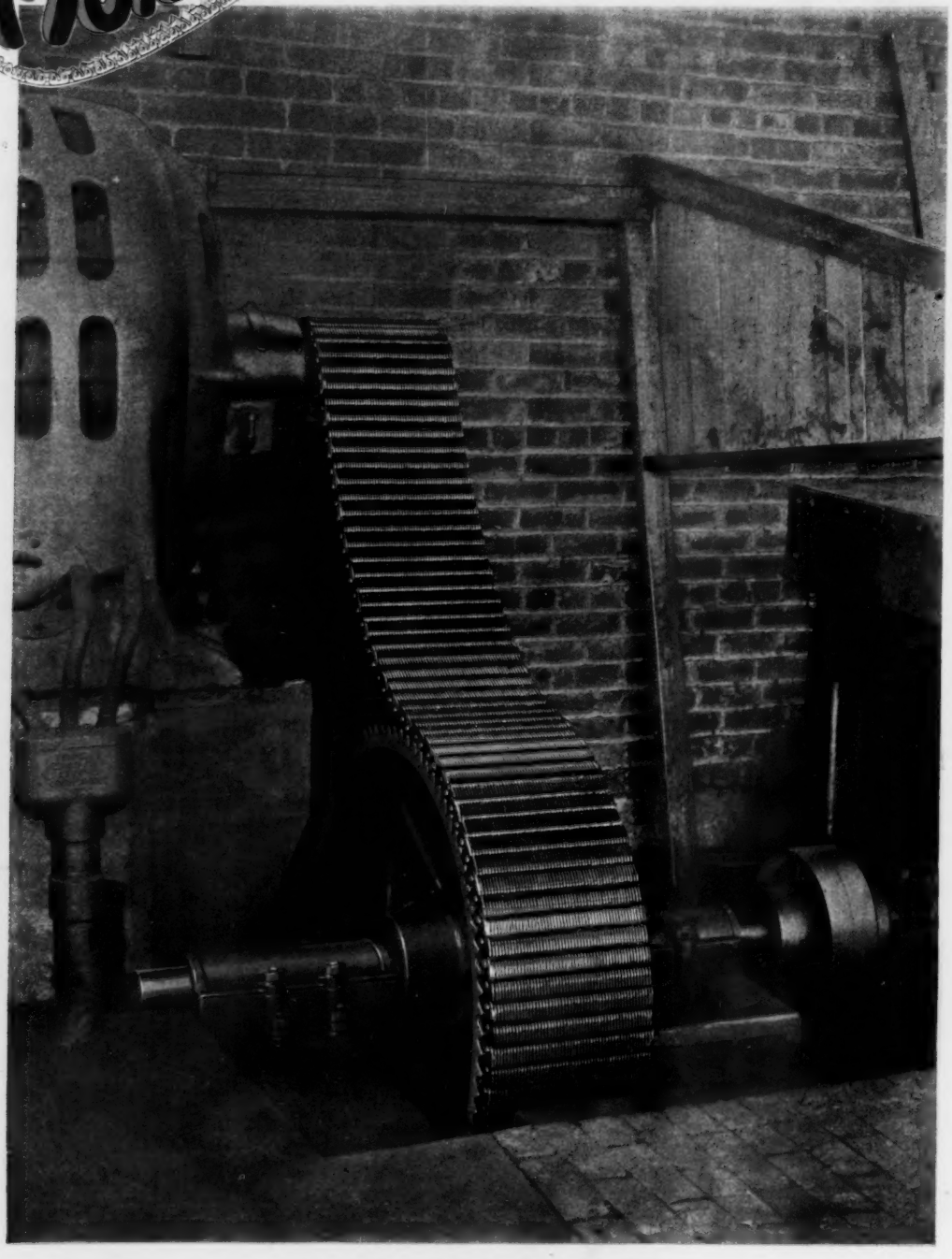
Ply Yarns Our Specialty

Egyptian—Sea Island—Peelers—Sakelarides

QUISSETT MEANS QUALITY

Ask Your Broker or Communicate Direct

MORSE SILENT CHAIN DRIVES



Morse Chain Driving Main Shaft.

FOR THE TEXTILE INDUSTRY

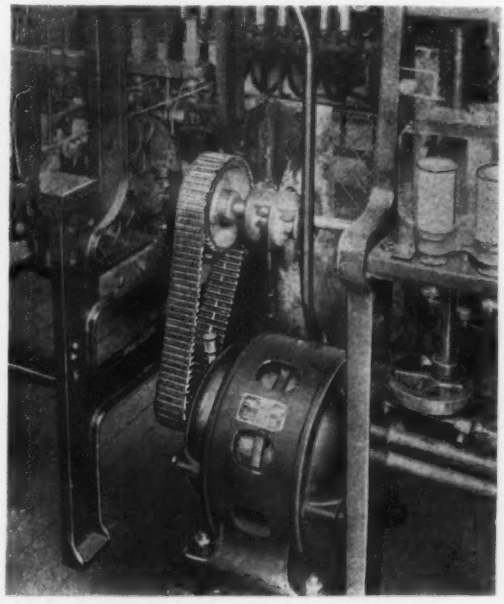
Greater efficiency with better working conditions

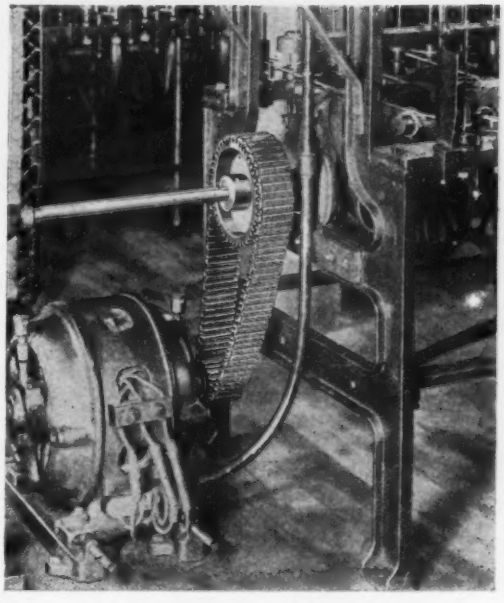
In cotton mills, Morse Silent Chain Drives are unexcelled for all around efficiency and desirability. Transmit 98.6% power efficiency, with positive fixed speed ratio between driver and driven. Are ideally adapted to the use of short centers, with the large subsequent saving of space, this permitting more productive and efficient machine arrangement.

Lower cost of upkeep, less lost time on account of repairs, less labor to maintain, less liable to abuse, no slippage or power loss, silent operation, no back lash or chatter, are a few of the additional advantages of a Morse Silent Chain Installation.

The cleanliness of Morse Silent Chain operation is of keen interest to mill operators who are doing everything to keep fly and other foreign substances from their product. With the Morse Silent Chain there is a much smaller amount of lint on the ceiling, no fly in the air from cleaning belts, no belt dressing flying off, no fly accumulating around the pulleys, no constant circulation of air from the floor to the ceiling to carry fly to the top of the room and let it settle back on the roving to get into the yarn.

Capable Morse Engineers will gladly sit in with mill executives who are interested in the timely and final solution of their transmission problems.





Morse Chain Driving shafts to spinning frames.

MORSE CHAIN CO., ITHACA, N. Y.

There is a Morse Engineer near you

ATLANTA, GA.	702 Candler Bldg., Earl F. Scott & Co.	NEW YORK CITY	30 Church Street
BALTIMORE, MD.	1402 Lexington Bldg.	MINNEAPOLIS, MINN.	413 Third Street, S., Strong-Scott Mfg. Co.
BOSTON, MASS.	141 Milk Street	MONTREAL, QUE., CAN.	St. Nicholas Bldg., Jones & Glassco, Reg'd.
CHARLOTTE, N. C.	404 Commercial Bank Bldg.	PHILADELPHIA, PA.	612 Franklin Trust Bldg.
CHICAGO, ILL.	Merchants Loan & Trust Bldg.	PITTSBURGH, PA.	Westinghouse Bldg.
CLEVELAND, OHIO	421 Engineers Bldg.	SAN FRANCISCO, CAL.	Monadnock Bldg.
DENVER, COLO.	1761 Wazee Street, R. M. Parsons	ST. LOUIS, MO.	Chemical Bldg., Morse Eng. Co.
DETROIT, MICH.	7601 Central Avenue	TORONTO, ONT., CAN.	Bank of Hamilton Bldg., Jones & Glassco, Reg'd.
KANSAS CITY, MO.	Finance Bldg., Morse Eng. Co.	WINNIPEG, MAN., CAN.	Dufferin Street, Strong-Scott Mfg. Co.

THE FOSTER CONE

Model Thirty 6" Traverse Cone, About 2/3 Regular Size

At the International Textile Exposition, Boston, Mass., Oct. 20th to Nov. 3rd, we will show all our latest designed Machines for Cone Winding, Tube Winding and Doubling, including the Foster Two Process System of Doubling, which is of special interest at this time to Makers of ply yarns.

The Textile Trade is cordially invited to inspect these Machines.

FOSTER MACHINE COMPANY

WESTFIELD, MASS.

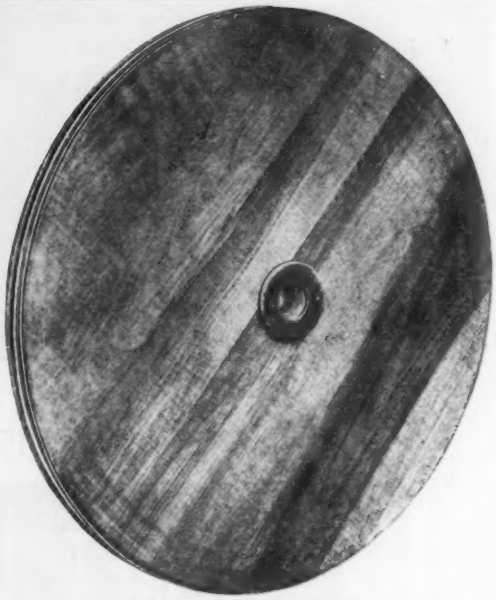
ALLEN COMPANY

PATENT

WOODEN BEAM HEADS SECTION BEAMS *and* COMBINATION SECTION BEAMS

Allen Company Wooden Beam Heads are practically unbreakable, insuring longer life, they are lighter in weight which insures ease of handling and also a great saving in freight charges. Out of the thousands in use, not one complaint has been received of one broken causing loss of yarn or expense of rewinding.

Constructed of three pieces of selected scientifically kiln dried Beech lumber, securely glued together under heavy hydraulic pressure. Accurately turned on centers. Protected on outside diameter from splintering and general wear by cold shaped upset steel tires. Finished by a water-proofing process and painted any desired color.



WOODEN BEAM HEAD

The Combination Section Beam has met requirements long demanded in that it is stronger, reduces loss from bent shafts, and is better adapted for storage and shipping of yarn. It is stronger, being built around the pipe and not the shaft itself. Inner heads, being driven on pipes under great pressure, are thus secured without use of wedges or metal flanges. Staves of barrels are fastened to inner heads by countersunk screws. Heads are held on barrel by means of stay-bolts passing through entire length of beam. Leverage on heads is lessened in so much as point of contact with beam is farther from center. Shaft passes through pipe, is accurately centered and held in pipe by taper nuts. If bent, release nut, remove shaft, straighten, then return to pipe. By removing shaft, loaded beams can be stood on end, making great saving in space for storage. Furnished complete with shaft, and can be used with either wooden or metal heads.

Combination Section Beam

WOODEN LOOM BEAM HEAD WITH BRAKE DRUM

OLD STYLE SECTION BEAM

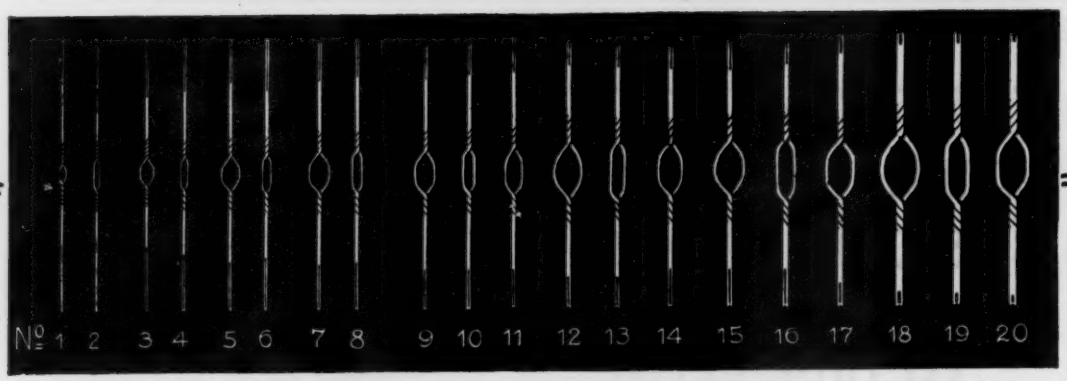
In the Old Style Section Beam shown above, shafts of cold rolled steel, instead of soft steel as commonly supplied, is used, thus greater strength is insured. Inside heads milled and forced on shaft under great pressure. Staves secured to inner heads by screws, holes being bunged to insure smooth surface on barrel. May be used with any make of head. Can also be furnished with lengthwise stay bolts to hold the heads on.

Allen Company Products, tried under your own conditions, will prove profitable investments. Catalog showing the complete line gladly furnished on request. Ask for it today.

ALLEN COMPANY, NEW BEDFORD, MASS.

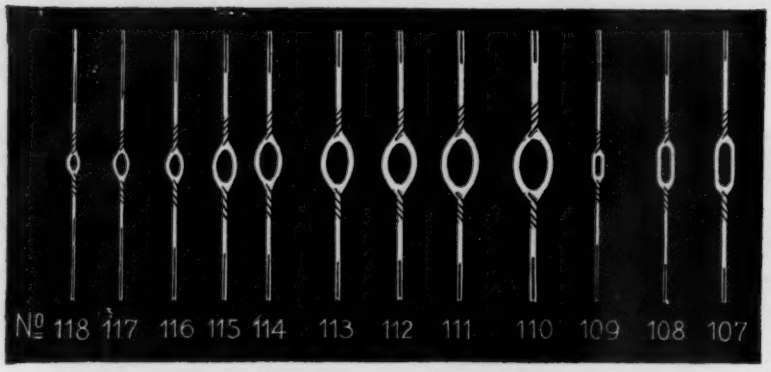
Also Manufacturers of

Top Beams, Beam Trucks, Box Trucks, Braider Reels, Lug Sticks, Mechanics Benches, Overseers Desks, Cabinets and other wooden specialties.

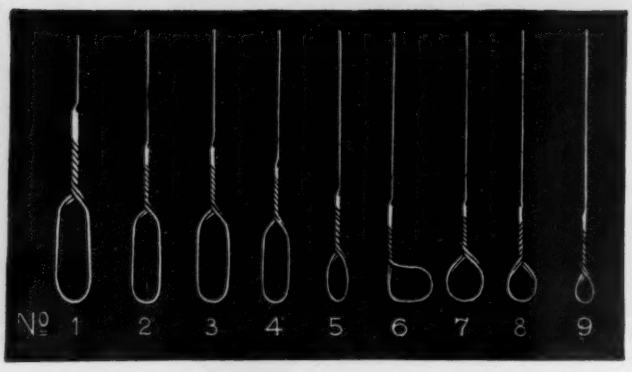


Ordinary Warp Eyes

SWISS TWIN WIRE HEDDLES



Inserted Steel Mails



End Loops

SWISS TWIN WIRE HEDDLES

J. J. REUTLINGER

160 Fifth Ave. **New York City**

Southern Representative; **RALPH M. LANE,** P. O. Box 1372, Charlotte, N. C.

ALL STEEL

Loom and Section Beam Heads

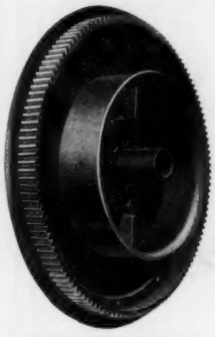
Cannot Break
Do not Bend

for

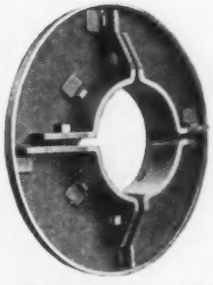
Replacement of broken heads and new equipment.

Absolutely guaranteed unbreakable. Will not bend or spring in warping or in handling.

Construction is such that your cast iron head can be duplicated in detail.



"ALL STEEL" LOOM BEAM HEAD
"MALLEABLE" GEAR
Patent Pending



"ALL STEEL" ADJUSTABLE HEAD
SPLIT OR SOLID TYPE
PATENT PENDING

Send us sample of your cast iron head and ask for samples of All Steel to replace.

Guaranteed not to bend or spring under the pressure of the yarn or in the usual handling and transportation.

Made in all standard sizes. Suitable for beaming when so specified.

Elastic and Non-Elastic Beam, Steel Headed Jack Spools, "High Speed" Braider Carriers, Braider Bobbins, "New Process" Drop Wires.

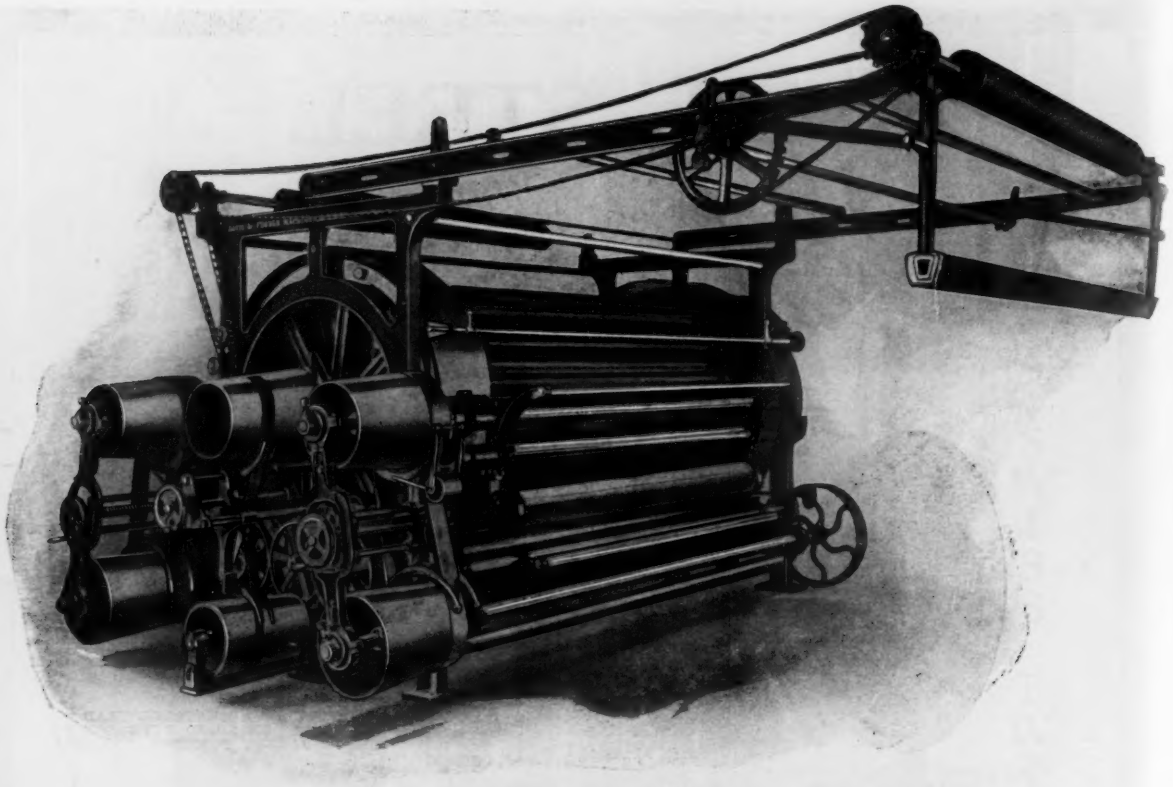
Ask for Samples.

"ALL STEEL" SECTION BEAM HEAD
PATENTED

Mossberg Pressed Steel Corporation

Attleboro, Mass.

SOUTHERN OFFICE 201 AUGUSTA ST. GREENVILLE, S. C.



36 ROLL DOUBLE ACTING NAPPER FOR COTTON GOODS

THE DAVIS & FURBER MACHINE CO.

OF NORTH ANDOVER, MASSACHUSETTS.

ESTABLISHED 1832

For 91 years manufacturing the highest type of Textile Machinery for Wool, Worsted, Cotton Waste, Jute, Mohair, Asbestos, Flax Waste, Silk Waste and Shoddy.

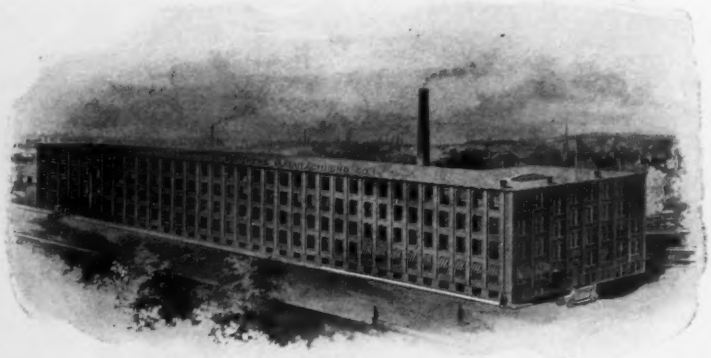
Its Cards, Mules, Nappers, Pickers, Dusters, Tape Condensers, Dressing Machinery, Card Clothing and Napper Clothing are the standard for America and are constantly being exported.

SPACES 155-156-157-158-159-160-161-162 INTERNATIONAL TEXTILE EXPOSITION

MECHANICS BUILDING, BOSTON, MASS., OCT. 29 to NOV. 3, 1923

WORKS OF THE DAVIS & FURBER MACHINE CO.

Headquarters For



Better Card Clothing

For fifty-seven years, the textile world has acknowledged Howard Brothers as Card-Clothing Headquarters. The fact that customers of 1866 are customers of today is conclusive evidence that Howard Products are satisfactory first and last.

The materials that go into Howard products are of the highest quality. Extreme care and careful inspection methods are exercised in the selection of cloths, leather, rubber and other materials, and only perfectly hardened and tempered steel wire is used.

Howard workmen are all craftsmen in their line, with years of experience back of their work.

Quality material and quality workmanship stand back of Howard Products and a thorough guarantee goes with the sale of every Howard product.

You can't go wrong on any Howard product, and we await your commands.

HOWARD PRODUCTS

CARD CLOTHING
NAPPER CLOTHING
WIRE HEDDLES
CYLINDER FILLETS
DOFFER FILLETS
HAND STRIPPING CARDS
STRIPPER FILLETS
BURNISHER FILLETS
EMERY FILLETS
STRICKLES

TOP FLATS RECOVERED

A complete equipment for recovering top flats has been established at our Branch Factory, 121 So. Forsyth St., Atlanta, Ga. Prompt service is assured, and in case of need there are extra sets of flats that can be loaned while your flats are in transit. This branch also carries a complete stock of Howard products ready for immediate delivery.

Howard Bros. Mfg. Co.

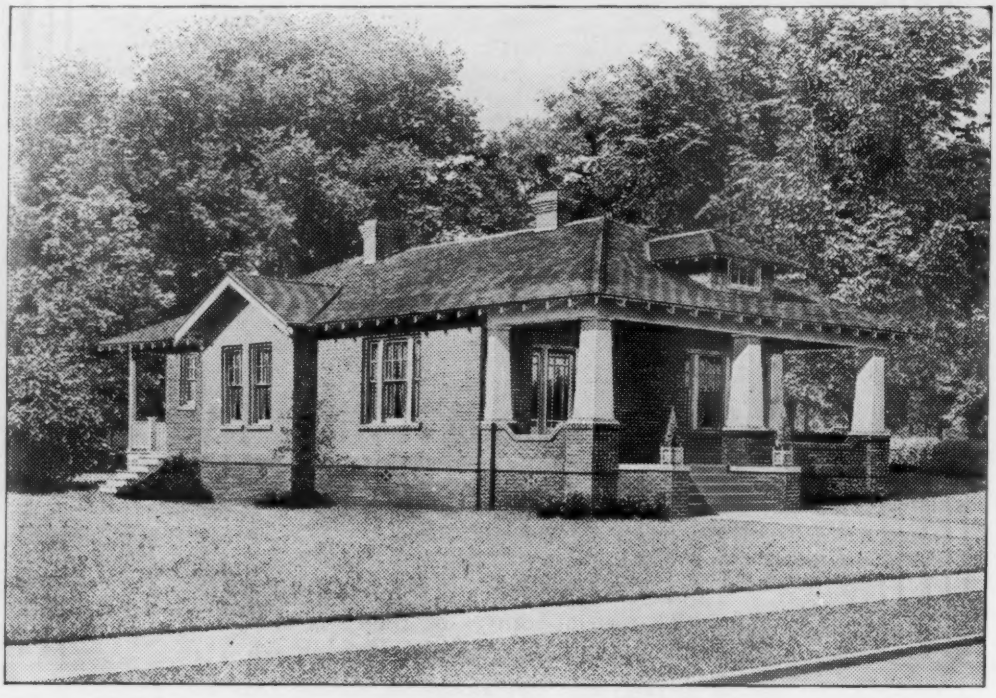
Established 1866

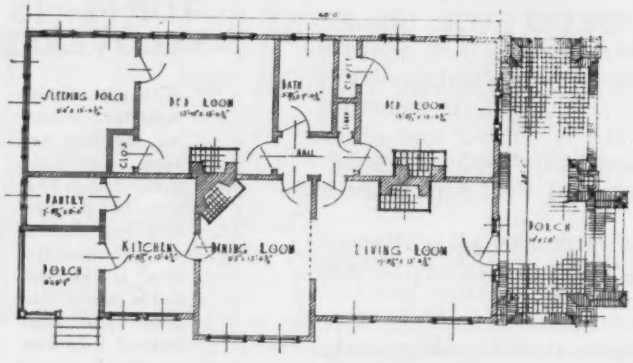
HOME OFFICE AND WORKS, WORCESTER, MASS.

Southern Agent
E. M. TERRYBERRY
1126 Healey Bldg.
Atlanta, Ga.

Asst. Southern Agent
GUY L. MELCHOR,
121 So. Forsyth St.
Atlanta, Ga.

We Handle Every Building Detail





FLOOR PLAN
of the Minter Home Illustrated Above

Type of Minter Home selected for Superintendent's Residence by a leading Textile Firm. Exterior finish of this attractive home may be either brick veneer, as shown, or in wood.

You are delivered completed homes when you place your housing in our hands. Only one contract is necessary.

No matter what your building needs may be—one and two-story community houses, churches, stores, school houses, moving picture theatres, apartment houses or other structures—you can have them erected in exact accordance with your plans or those of your architect without being troubled by any detail.

All Minter structures are built of the best materials of the kind specified, are erected in minimum time and without loss of time, labor or materials.

The Minter System is the modern method of building that saves your time, your nerves and the money of you and your stockholders.

Write us today about the houses you need.

THE MINTER HOMES CO.
GREENVILLE, SOUTH CAROLINA

MINTER HOMES CORPORATION
HUNTINGTON, WEST VIRGINIA

A Model of Manufacturing Efficiency

THIS is the new dye-house and finishing building of the Phoenix Hosiery Company at Milwaukee, *one of the largest single units in the country devoted entirely to hosiery finishing.* The building is a model of manufacturing efficiency.

Location of the dye-house at the top of the building assures a maximum of natural light and ample ventilation, and keeps the vapor and fumes from other parts of the building. Stock is raised at one lift from the undyed stockroom in the basement to the dye-house on the 7th and 8th floors, and then is carried by gravity to the other operations on the floors below.

Boarding, mating and boxing rooms are located on the 4th, 5th and 6th floors, so arranged as to provide a minimum amount of handling of boarded goods.

Meeting difficulties, and in many cases turning them to advantage, is one part of the service of Lockwood, Greene & Co. In overcoming the obstacles encountered in designing the Phoenix Hosiery building, Lockwood, Greene & Co. were aided by years of experience as textile mill engineers and managers. More detailed information about this building and others of equal interest will be provided on request. A Lockwood-Greene representative will be glad to call and discuss your own building problems.

LOCKWOOD GREENE

BUILDING WITH FORESIGHT

LOCKWOOD, GREENE & CO.

ENGINEERS

EXECUTIVE OFFICE, 24 Federal Street, BOSTON 9

BOSTON ATLANTA CHICAGO NEW YORK

DETROIT CLEVELAND CHARLOTTE

Lockwood, Greene & Co. of Canada, *Limited*, Montreal

Compagnie Lockwood Greene, Paris, France

No Brick Pavement Ever Wore Out From the Top Down

many cannot stand alone against all the world.

Permanent.

It is difficult to conceive of a legitimate argument against the proposition of the Ohio motorists that the state's main market highways be built with permanent "hard" surfaces. The suggestion argues itself. It may be permissible under some circumstances to construct less expensive roads in less traveled territory, but for the chief arteries of travel permanence ought to be a fundamental consideration.

We are in the midst, or perhaps at the dawn, of a motor age. Highways everywhere have become motor roads primarily, and the number of vehicles rapidly increases. Building perishable highways is as short sighted as it would be to erect houses without roofs in the expectation that no rain will fall. Highways must be built not only to support present traffic but the traffic that may be confidently forecast for the years at hand.

Permanence means smaller bills for maintenance, thus returning to the treasury some of its additional first cost. If a road is in continual need of repairs the indication is that the work was of a wrong type or was improperly done in the first place. Our idea is to put more money into original construction and thus avoid the necessity of putting so much into maintenance.

Is Europe Recovering?

Reports in regard ... economic

A forceful paving preachment from the May 16 issue of the Cleveland Plain Dealer

IF there is a faulty brick pavement in your vicinity, remember this:—the chances are at least one hundred to one that either a poor foundation or bad drainage conditions wrecked it.

The fire-hardened brick on the surface, you can easily assure yourself, shows little or no wear except where failures *below the surface* have thrown individual bricks out of position. The perfect condition of the great bulk of the brick is ample proof of where the fault lay.

An enduring, low-upkeep pavement is a combination of three factors:—*first,* thorough and intelligently planned drainage; *second,* an adequate, well-built foundation; *third,* a vitrified brick surface.

Without the first two factors no road surfacing material can render lasting service. Without the last no street or road can withstand modern traffic and hold a smooth riding surface without creating a continuous drain on the public treasury for endless maintenance and repair charges.

Public sentiment on public paving jobs is accurately reflected by the newspaper editorial here reproduced.

FOR MODERN TRAFFIC CONDITIONS

VITRIFIED

Brick

LONG LIFE PAVEMENTS LOW UPKEEP

NATIONAL PAVING BRICK
MANUFACTURERS ASSOCIATION
ENGINEERS BUILDING CLEVELAND, OHIO

Marvin Carr Building of Durham Hosiery Mills

"The Test of Strength"

BACK of the Durham Hosiery claim that it is "Made strongest where the wear is hardest," is the accumulated experience of three generations of hosiery manufacturers and a group of loyal workers in its several mills.

With such ideals of service to the wearer, it is small wonder that the Durham Hosiery Mills have grown from the modest beginnings of their illustrious founder to the present proportions required to meet a strong national demand.

For eleven years we have been participating in the growth and development of this group of mills, through an engineering organization trained in the design and planning of textile and allied industrial establishments.

At least one of these new and revised editions of our books will interest you—write us which one.

"Picks to the Minute"—A short treatise on textile plants, their design and operation.

"Contentment Under Roof"—A review of some facts on the economical construction and results of industrial homes.

"Factories for the Future"—An application of foresight to the design and layout of industrial plants.

If you wish, a member of this organization will confer with you upon your own individual problems. This involves no obligation.

DURABLE DURHAM HOSIERY

J. E. SIRRINE & COMPANY

Engineers

Greenville South Carolina

SERVICE

The South

Industrial conditions in the South are unlike those in any other section of the country. The profitable textile mill of the Greater South must be planned with specialized knowledge of Southern textile conditions—knowledge based not only on the most economical and ideal location for the mill but on general industrial and labor conditions in the different sections and the types of buildings and equipment best suited to Southern conditions.

We are a Southern concern knowing local conditions, whose reputation is known over the entire South. Our service is saving money not only for our Southern clients but for other textile organizations moving to or building branch plants in the South. This service includes reports, surveys, new building plans, machinery arrangements, mill village developments, water power and steam power projects.

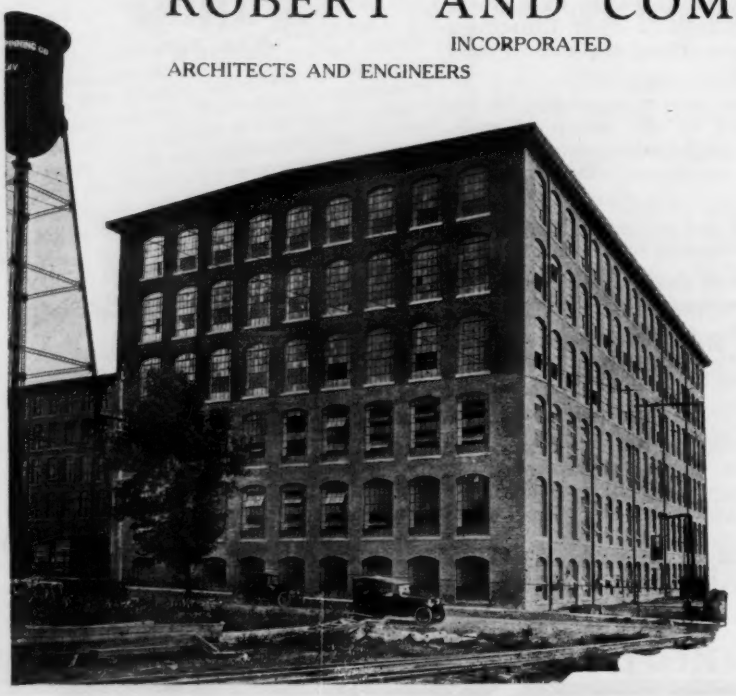
Among our clients are such companies as the Bibb Mfg. Co., Standard Textile Products Co., Manville-Jenckes Co., U. S. Finishing Company, Wellington-Sears & Co., Cannon Mfg. Co., Callaway Mills, etc. We have work now under progress in North Carolina, South Carolina, Georgia, Tennessee, Virginia, Alabama, Mississippi and Texas.

We invite confidential correspondence or a consultation as to your plans in the South.

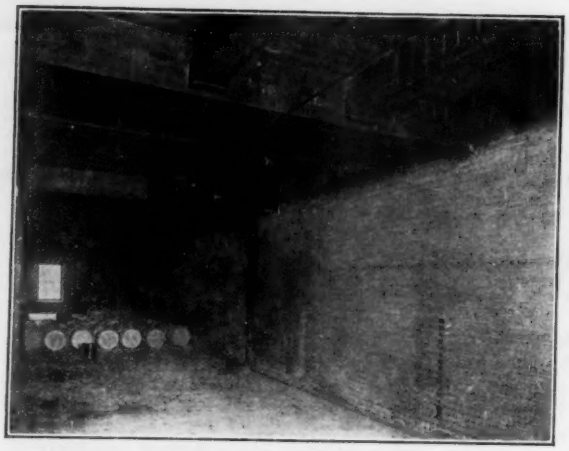
ROBERT AND COMPANY

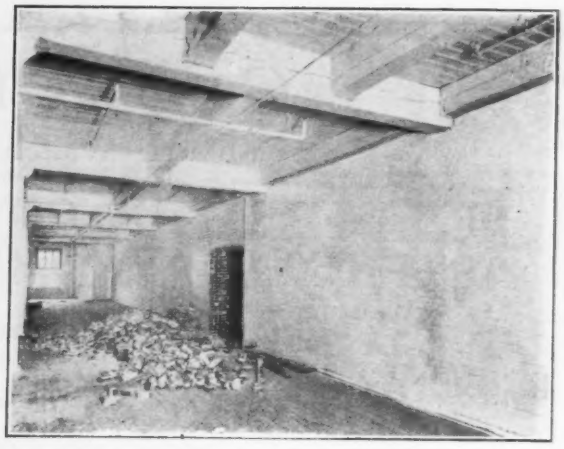
INCORPORATED

ARCHITECTS AND ENGINEERS ATLANTA, GA.



Recent addition at the Manville-Jenckes Company's Loray Plant, Gastonia, N. C., total of 138,000 spindles. The largest mill in the South. Aberthaw Construction Co., Contractors.





These two views, taken from unretouched photographs, show the remarkable difference that Surlight will make in the storage plant. Note especially how the dark corner in the rear has been brightened up by the use of Surlight

The Whitest Paint Made!

Surlight is the whitest mill-white paint made. This is an actual fact that is open to demonstration—results will show that in every case, under similar conditions and service. Surlight is whiter when applied, whiter when dry, and stays white longer than any paint or enamel you can buy.

Surlight has very high light-reflecting properties, completely free from glare or dazzle. It diffuses a soft, restful light—eye strain is lessened, and since workers can see better, naturally they do better and more work. Spoilage is reduced, production increased, and many accidents prevented.

Surlight makes workrooms more cheerful and pleasant—it sheds light in dark corners and discourages the practice of allowing rubbish to accumulate in places where otherwise it would not be seen.

Surlight is not a dust or dirt catcher—it dries with a hard, smooth surface that is non-porous and can be washed as frequently as desired. It withstands shocks and jars—does not powder, check or flake and will not fall off and spoil warp.

Surlight has great covering power and spreads easily when brushed on. It can be sprayed on if desired.

The next time you paint, invest in Surlight! Its first cost is reasonable and because it wears so long it makes frequent repainting unnecessary.

Send for our book on Surlight—we also manufacture a full line of paints for all purposes and will gladly send complete details on any phase of painting in which you may be interested.

ST. LOUIS SURFACER & PAINT CO.

4211 Arlington Ave., St. Louis, Mo.

SURLIGHT

The Light Reflecting Wall Paint for Industrial Purposes

GEORGE DOWMAN

610-611 Walton Building, Atlanta, Ga.

YOU CAN VENTILATE AT LOW COST WITH CALLAHAN SASH OPERATORS

Seven Callahan Features

Convenience
Economy *Compactness*
Safety *Neatness*
Tightness *Ease*

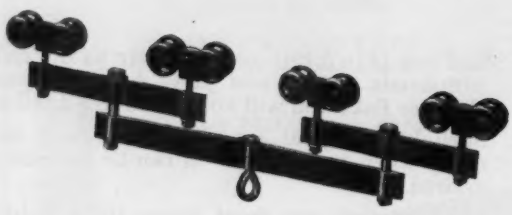
Invigorating fresh air, a natural resource to plant production, is yours with only the initial cost of mechanical sash operators. Callahan Sash Operators are built to serve you on any type of pivoted or hinged sash—wood or metal—with practically no maintenance expense.

Tell us of your desires—your difficulties—whether you have old or new buildings under consideration. Our specialized experience is at your disposal without obligation.

THE T. J. CALLAHAN COMPANY

803 S. PERRY ST. DAYTON, OHIO

WAGNER OVERHEAD CONVEYING EQUIPMENT



IS IDEALLY ADAPTABLE TO COTTON MILL OPERATIONS CONSERVES LABOR---SAVES TIME AND FLOOR SPACE

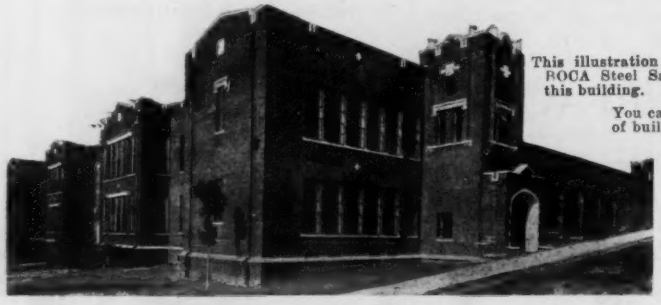
Do your trucking on the ceiling and consolidate your conveying and hoisting operations.

Wagner Equipment includes a complete line of Switches, Crossovers, Curves, and Cranes. Carriers are equipped with high grade roller bearings and can be furnished with "Hyatt" Roller Bearings if desired.

Write for Catalogue

Wagner Manufacturing Company, Cedar Falls, Iowa.

BOCA SOLID STEEL SASH



This illustration shows English Avenue Public High School, Atlanta, Ga. BOCA Steel Sash, equipped with top sliding ventilators are installed in this building.

You can depend upon BOCA Steel Sash when installed in any type of building. Approved by the National Board of Fire Underwriters, this sash insures protection against the ravages of fire.

Other advantages of this sash are (1) Ventilators are equipped with **three point weathering** contact which makes them 100% storm proof. (2) The patented **lock joint** at all intersecting members gives a most rigid and substantial construction.

Catalogue on request.

Daniel & Benteil, Architects:
A. Ten Eyck Brown, Supv. Arch.; } Atlanta, Ga.
Barge Thompson Co., Contractors:

THE BOGERT & CARLOUGH CO.

Paterson, N. J.

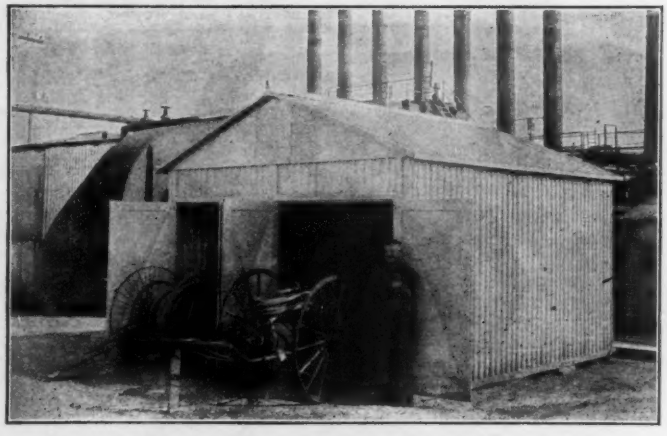
Southern Selling Agent for the Products on These

CONTRACTORS AND SALES ENGINEERS

ARE YOU READY TO FIGHT FIRE?

The Enemy To Your Prosperity

Be Efficiently Equipped When the Alarm Sounds By Keeping Your Apparatus in a MARYLAND METAL BUILDING



Hose Reel House—Now in operation Furnished in the Size You Require

FOR SURE PROTECTION AND SERVICE

MARYLAND METAL BUILDINGS are constructed of the Rust-resisting

Ivonore Metal

They are Fire-proof, Lightning-proof and Weather-proof — Preventing Damage to Equipment and Rotting of Hose; thus, Insuring against its Bursting when Every Minute Means the Saving of Thousands of Dollars worth of Property.

Write for Plans and Estimates

MARYLAND METAL BUILDING COMPANY

RACE AND McCOMAS STREETS
BALTIMORE, MD.

—SECTIONAL METAL BUILDINGS FOR EVERY PURPOSE—

GEORGE DOWMAN

610-611 WALTON BLDG.,

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"DOWMAN SERVICE" IS KNOWN ALL OVER THE SOUTH. TAKE ADVANTAGE OF THIS SERVICE WHEN IN NEED OF ANY OF THE FOLLOWING:

FIRE PROOF DOORS
SOLID STEEL SASH
HOLLOW METAL WINDOWS
STEEL CASEMENTS
VENTILATORS
METAL CEILINGS

STEEL BUILDINGS
METAL LATH
STEEL FENCE
SASH OPERATORS
OVERHEAD CARRIERS
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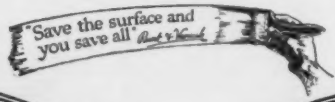


For Improved Lighting

DAYLIGHT alone is not enough—diffusion and proper distribution are equally essential.

That is why OJACO Mill White is used in small as well as large textile mills throughout the country.

OJACO Mill White intensifies the sun's rays—magically transforming dimness and dinginess into brightness and cheerfulness.

For further facts regarding OJACO Mill White, get in touch with the nearest of the OJACO distributors listed opposite.

Oliver Johnson & Co., Inc.

Paint Makers since 1833

PROVIDENCE, R. I.

PERMANENT ROOF CONSTRUCTION

A series of articles by the Technical Staff of the Richardson Research Laboratories, showing what modern science has done to perfect the materials and methods of roof construction

No. 1. The chemical requirements of a perfect waterproofing bitumen

Scientific investigation in the Richardson Research Laboratories has uncovered facts which put the selection of roofing material on an entirely new basis. A knowledge of these facts will help you to make your future roofing jobs *permanent*.

According to the science of roof construction, the two basic materials which you need to make a permanent roof, are as follows:

(1) A pliant, durable, adhesive waterproofing bitumen, free from destructive chemical elements and absolutely impervious to water.

(2) A felt foundation which in spite of severe weathering, will permanently hold this bitumen fast to the roof.

New methods replace the old

Engineering skill had early developed with satisfactory results, the art of *applying* certain roofing or waterproofing systems. But the permanence of these results could never be depended upon.

The reason is this: not enough effort was made to develop the waterproofing agent, the bitumen, to fit its particular job. Even though the most capable architect planned and the best engineer applied a theoretically correct system of roofing or waterproofing, both of these men would confess that they knew little or nothing about the actual waterproofing agent, the bitumen.

With these facts in mind, the men in the Richardson Research Laboratories concentrated their years of scientific experience in order to solve the problem. The result was a blend of waterproofing bitumen more efficient than had ever been devised.

What makes good waterproofing

This new product, Viskalt, gives you a degree of permanence in waterproofing hitherto unknown. For its constituents are so balanced that, unlike ordinary waterproofing, they hold together in spite of unusually destructive weather attacks.

A glance at the underlying chemistry which led to the discovery of Viskalt will quickly show you why.

In all waterproofing bitumens there are certain essential constituents. Up to a few years ago these were thought to be merely *asphaltenes*, the backbone of the bitumen, and *malthenes*, the water-repellent film. Consequently, all bitumens were considered alike, and no one really knew why, for example, some roofs outlasted others.

But now research has proved that in asphaltic bitumen there are certain other constituents which if not properly proportioned, destroy its waterproofing value. Thus the cause of a leaky roof might chemically be explained as follows:

The newly-discovered constituents are free asphaltous acids and asphaltic anhydrides which, if too plentiful, act upon the asphaltenes and malthenes to produce *carbenes*—the tubercular germ of waterproofing bitumen. These harmful particles break down the waterproofing film and let in the weather.

Many so-called natural asphalts such as lake asphalt, it is now known, contain high percentages of these harmful constituents. Viskalt, on the other hand, is derived from Mexican asphaltums which contain less asphaltic acids and anhydrides than any other commercial asphalt.

In addition, Viskalt has the proper amount of resins (not rosins) combined with the malthenes which give it the required adhesiveness. And the proportion of its asphaltenes lends it remarkable inner stability.

The chemistry of Viskalt then, shows it to be a firm, adhesive waterproofing bitumen, exceptionally free from destructive chemical elements. In other words, it seals your roof with a continuous unbroken layer, absolutely impervious to water.

For further facts about the basic principles of permanent roof construction consult the article for next month.

Viskalt is made by a firm backed by over fifty years of manufacturing experience. There is a Viskalt compound for every waterproofing need. For complete specifications just write the Construction Materials Division. Dept. 44-G

The RICHARDSON COMPANY

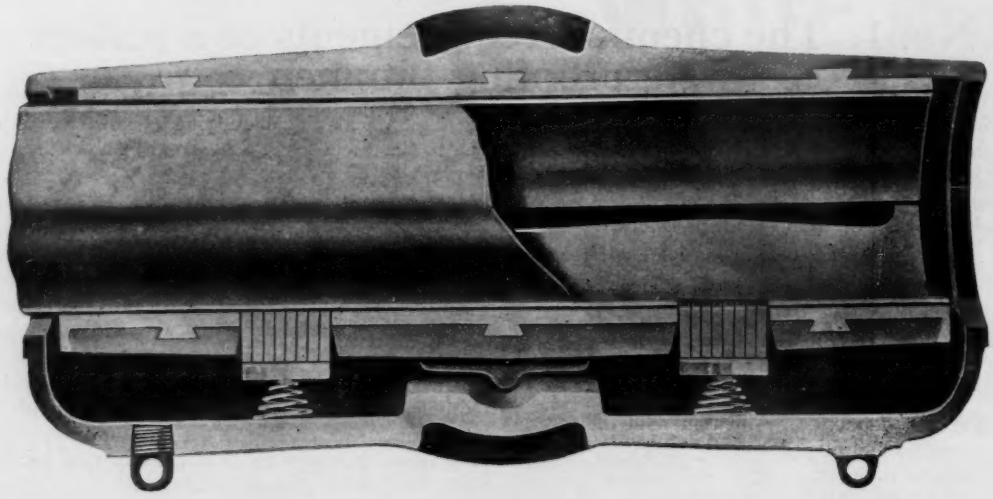
Dept. 44-G, Lockland, (Cincinnati), Ohio
Melrose Park (Chicago), Illinois, New Orleans, La.

Viskalt
Pliant Under Stress

RICHARDSON Product
(1868)
From the makers of Richardson Roofing (including Flex-a-tile Housetops), Viskote, Wall Board and similar products

© 1923, The Richardson Company

Lubrication as positive as the flow of sap in the spring



What about your investment ten years from now? That is the important question

When we say that a Dodge capillary bearing will be in every respect as efficient and economical after ten years' service as when first installed we are backed by actual performance records under average operating conditions.

Laboratory tests are not made under average conditions—they offer no guarantee of future efficiency—they give no warning of broken parts, scored shafts and expensive replacements.

What you want is a time-tested bearing—you want your investment protected for many years. Performance of the past is a safe guarantee of the future.

The Dodge Capillary bearing combines proper bearing area, positive lubricating means and good babbitt, the three vital requisites of an efficient bearing.

Lubrication by capillary attraction is positive and unfailing. An absolutely uniform and unbroken film of clean lubricant is constantly maintained between shaft and liner. There are no moving parts in the capillary bearing—hence no churning of the oil—dirt settles to the bottom, where it belongs, and stays there.

An installation of Dodge capillary bearings represents a moderate first cost—insures low upkeep and substantial dividends in power savings. Buy them from your local Dodge dealer on the immediate delivery basis.

Read what these users say—

After 21 years service—

"Our experience leads us to believe that Dodge Capillary bearings are the most dependable of all types for continuous service."

Running at 2300 R. P. M. for ten years—

"This line shaft (2300 R. P. M.) has been operating for ten years and during that time we have not had *any* trouble."

Ten years service—never a hot bearing—

"We are glad to state that your capillary bearings continue to give satisfaction. We have never had a hot bearing where they have been used."

Another ten year user—

"Have been using Capillary bearings for ten years and have the first complaint to make."

"None better on the market"

"Your capillary bearings are giving us very satisfactory service—we believe there are none better on the market."

Names on request.

DODGE

Capillary Bearings

Dodge Manufacturing Corporation

General Office: Mishawaka, Indiana Works: Mishawaka, Indiana, and Oneida, N. Y.

New York Philadelphia Pittsburgh Boston Cincinnati Newark Chicago
Atlanta Minneapolis St. Louis Houston Seattle San Francisco

They Are Just As Valuable In Present Frames

You need not wait until you order new spinning and twister frames to cash in on the economy and durability of Hyatt roller bearings.

The Hyatt replacement box makes it very easy to modernize your present equipment by replacing the old style wasteful plain bearings with economical power saving Hyatt bearings.

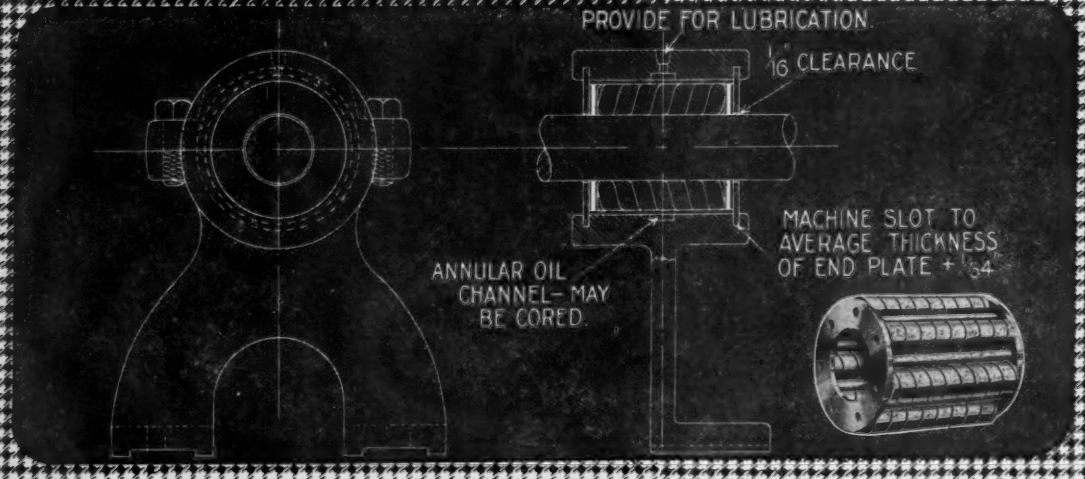
Tests under actual operating conditions show that Hyatt bearings save more than ½ H.P. per frame —this saving alone will pay for the bearings in a very short time and they will continue to pay dividends throughout the life of the frames.

The oil-tight housing of Hyatt bearings retains the oil, therefore they need oiling only 3 or 4 times a year.

You can secure all advantages of Hyatt bearings on any make of frame now. Write us for complete information.

Hyatt Roller Bearing Company

Newark Detroit Chicago San Francisco
Worcester Milwaukee Huntington
Minneapolis Philadelphia Cleveland
Pittsburgh Buffalo
Indianapolis


PROVIDE FOR LUBRICATION
1/16 CLEARANCE
MACHINE SLOT TO AVERAGE THICKNESS OF END PLATE + 1/64"
ANNULAR OIL CHANNEL- MAY BE CORED.

Do you know ?

The "Rule of 3"

of Turbine Lubrication

?

It's given on page 32 of "The Lubrication of the Steam Turbine" Published by The Texas Company.

THIS 36-page book has received high praise from operators and builders of turbines. It is not loaded with propaganda for Texaco Turbine Oils.

This book discusses LUBRICATION. In logical sequence these important items are taken up: oiling systems—lubricating methods—effects of heat, water and deposits—cleaning—starting—oil coolers—reduction gears.

NOT a theoretical treatise for students only; but for men interested in turbines and the use of oil. It contains no pretty pictures or long "History of the Turbine" going back to the ancient Greek who discovered its principle. The text pages are all "meat."

"LUBRICATION OF THE STEAM TURBINE" was written by and checked up by men who have observed lubricants at work on all types of turbines.

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Ask Our Engineers

They can solve your problems

The experience of our engineers covers every type of ball bearing installation ever designed.

Vast files of data, huge stores of information are at their command. And clients of ours are entitled to the technical advice of our experts.

Strom Service means perfect service.

Quick deliveries; the highest grade of product; a keen interest in the successful performance of every bearing throughout its life.

Our surplus is your reserve. Vast resources of engineering knowledge; skilled engineers who will design your installations.

Constant experimental work looking to new and more efficient uses of ball bearings, simpler and more practical methods of reducing friction.

Even if you are not a client of ours, we will be glad to have you put your problems up to our staff of consulting engineers. There is no obligation. Just drop us a line.

Double-acting thrust bearing, flat seats (grooved races) 2100-F Series

Single-acting thrust bearing, flat seats (grooved races) 1100-F Series

Single-acting, self-aligning thrust bearing 1100 Series

Single-acting, self-aligning thrust bearing, leveling washer. 1100-U Series

Double-acting, self-aligning thrust bearing, leveling washers 2100-U Series

Single-row deep-groove Standard type, radial bearing

Double-row, deep-groove Standard type, radial bearing

Angular contact bearing, combination radial and thrust

Double-row, maximum type, radial bearing

Single-row, maximum type, radial bearing

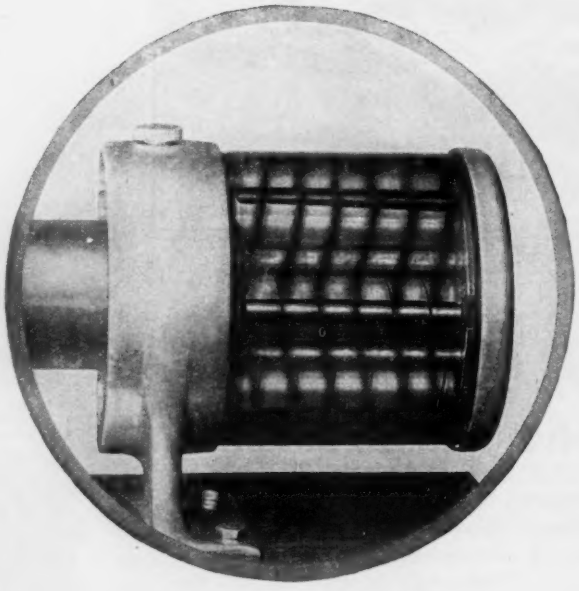
Strom BALL BEARINGS

Production is sped by the reduction of friction

U. S. BALL BEARING MFG. CO.

4544 Palmer Street, Chicago, Ill.

Did You Ever See a Hyatt Roller Bearing *In a Glass House?*



Here is a Hyatt roller bearing mounted in glass instead of steel to enable you to observe the circulation of the oil.

As the hollow rollers revolve, the oil flows out of the slots in parallel bands which cover the entire bearing surfaces. As long as any oil remains in the bearing it will be constantly picked up by the rollers and distributed in the path of the following rollers.

Because of this positive, self-oiling feature of Hyatt roller bearings it is only necessary to add lubricant to them occasionally, usually 3 or 4 times a year, which makes a worthwhile reduction in lubrication costs, oil and labor.

This positive, self-oiling feature of Hyatt roller bearings is only one of their good points.

Their true rolling motion saves at least 15% power and their durable high grade steel construction enables them to effect these economies for many years without adjustment or replacement.

They have been operating for from twenty to thirty years in many plants and are still in good condition.

Split throughout, Hyatt roller bearings can be applied to existing lineshafts without taking down shafting or removing pulleys, collars or couplings.

Secure these economies for your plant by asking your nearest mill supply dealer to furnish you with Hyatt roller bearing hangers.

They are just as economical and dependable in cranes, trolleys, hoists, conveyors, industrial trucks and trailers, machine tools, electric motors and any other machinery where economy and dependability of operation are desired.

'Phone the Nearest Mill Supply Dealer

Hyatt Roller Bearing Company

Newark, New Jersey

Pacific Coast Address:

Hyatt Roller Bearing Company, San Francisco, California

AUTOMATIC MECHANICAL SPEED CONTROL

THROUGH

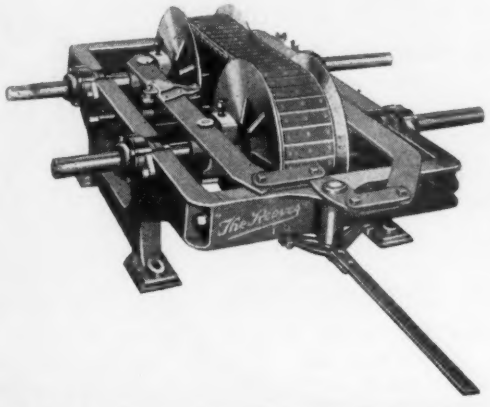
"The Reeves"

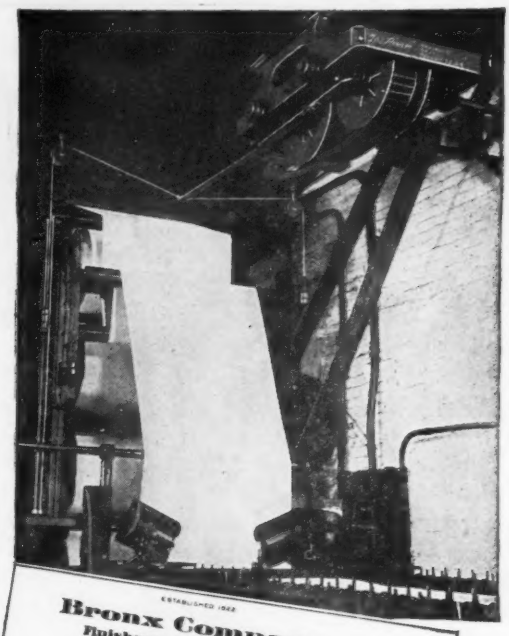
VARIABLE SPEED TRANSMISSION

Extremely simple, sensitive and reliable. Very inexpensive—easily and quickly installed. No electrical apparatus nor complicated switches to get out of order. Will operate without a moment's attention or a penny's expense after once installed. Absolutely fool-proof.

"The Reeves" Variable Speed Transmission as illustrated below, with two sets of weights and light connecting chains are the simple component parts that make up this extremely dependable automatic drive. Not a single part to get out of order.

"The Reeves" Automatic Mechanical Control has been found highly successful in textile mills where all operations in finishing cloth through water mangles, dryers, tenters and winders are accomplished as one continuous process.





Bronx Company
Finishers of Cotton Goods
177th Street and Bronx River
New York

Reeves Pulley Company
Columbus, Indiana.

June 26th, 1923

Gentlemen:

We are very glad to state that the Reeves automatic control recently installed by you on our new tenter range at our plant is working nicely. After once started, this device controls the speed of the first division so perfectly that it is hardly necessary to watch the tension of the cloth at all.

We are certainly very much pleased with the operation of this machine and would not hesitate to recommend it to any one interested.

Yours very truly,
BRONX COMPANY
By A. V. Bolton
Vice-President

ATB:MLV

No. 3-E. REEVES Automatic control operating Butterworth Dryer at the Bronx Co., New York City.

With the installation of "The Reeves" Transmission the operator can keep the speeds of two or more machines running in exact unison. He sets the speed of the master transmission by hand, or by remote control, to suit the condition of the goods being processed; and all the balance of the machines in the line are adjusted automatically by "The Reeves" Automatic Control.

This produces a fineness and uniformity of finish, not posible by other methods. Write for Automatic Mechanical Control bulletin, C-2055.

REEVES PULLEY CO.

COLUMBUS, INDIANA.

The Eclipse
Automatic Yarn Cleaner

AN entirely new principle is involved in that the yarn is cleaned by flexible blades which vibrate constantly. This device is small and compact and easily attached. The strength and elasticity of the yarn is not affected in the slightest.

ECLIPSE VAN NESS
Dyeing Machines

Random Dyes, Cotton, Wool or Silk yarn on the cone by injecting the dye into the cone under pressure.

Write for full data

ECLIPSE TEXTILE DEVICES, INC.

Makers of

Eclipse Automatic Yarn Cleaners | **Eclipse Automatic Stop Motions** | **Eclipse Yarn Tension Devices**

ELMIRA, N. Y.

(We suggest that you tear and file this and the following five pages)

H. W. BUTTERWORTH & SONS CO.

ESTABLISHED 1820

Finishing Machinery

PHILADELPHIA, PA.

BRANCH OFFICES

PROVIDENCE, R. I., Turk's Head Building
GREENVILLE, S. C., Woodside Building
CANADIAN REPRESENTATIVE—W. J. Westaway Company, HAMILTON, ONTARIO

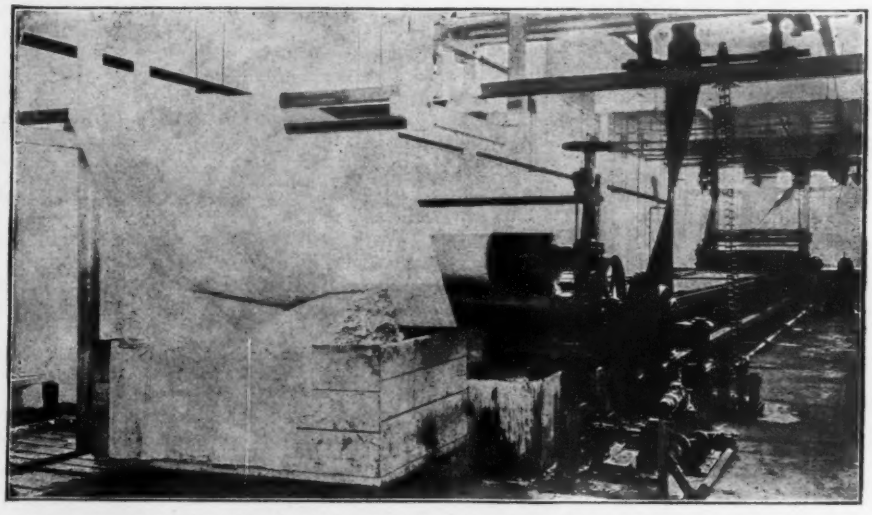
THE BREADTH OF THE BUTTERWORTH LINE

That you might have a better knowledge of the types and kinds of finishing machinery made by H. W. Butterworth & Sons Company, we show on this and the following five pages a few individual machines, parts of installations made by us during the past couple of years.

Most of these incidentally were in Southern mills and finishing plants.

In practically every installation, we supplied the finishing machinery in its entirety, often designing and constructing new machines to meet individual requirements. This is part of Butterworth's Service.

As to the complete line of Butterworth Machinery—this includes practically every kind of machine used in finishing cotton, silk and woolen fabrics, lace curtains, carpets, book cloth, window shade materials and damasks.



MERCERIZING TENTER PADDING MACHINE AND TWO COMPARTMENT WASHER

MERCERIZING MACHINE

The illustration shows a special heavy mercerizing tenter, a padding machine and two compartment washer, in range.

Mercerizing Tenter—55 ft. long, adjustable in width 12 in. to 86 in., equipped with Butterworth patented 4 in. No. 33 automatic clamp chain, face opening, side shafting with stands, bevel gears, etc., for driving back to padding machine. Driven by G. E. 25-h.p. motor, 900 r.p.m.

Padding Machine—Heavy housings with compound levers, screws and handwheels, top and bottom covered rolls each 15 in. dia. x 90 in. face, rubber covering ¾ in. thick and center cast-iron roll 12 in. dia. x 91 in. face. Machine complete with cast-iron caustic box having four immersion rolls, driven by expansion pulley and cut cast-iron spur gearing. At delivery side 5-bar Mycock expander.

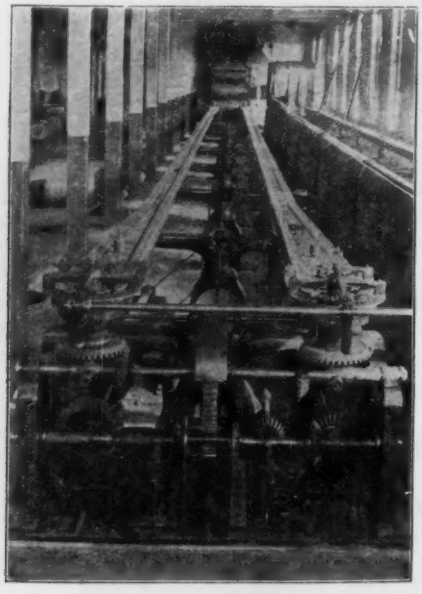
Two Compartment Washing Machine—Cast-iron boxes having housings complete with levers and weights for three sets of squeeze rolls. First and second sets of squeeze rolls have top rubber-covered rolls each 10 in. dia. x 90 in. face; rubber covering ¾ in. thick and bottom iron rolls each 10 in. dia. x 90 in. face. Third set has top rubber-covered roll 10 in. dia. x 90 in. face, rubber covering ¾ in. thick and bottom rubber-covered roll 10 in. dia. x 90 in. face, rubber covering ½ in. thick. Each compartment has seven 5 in. dia. iron tube immersion rolls. Machine is driven by side shafting with cut bevel gearing and expansion pulley. Overhead drive, countershaft having friction driving pulley. Reel at delivery end furnished by us.

Continued on next page

H. W. BUTTERWORTH & SONS CO.

TENTERING MACHINES

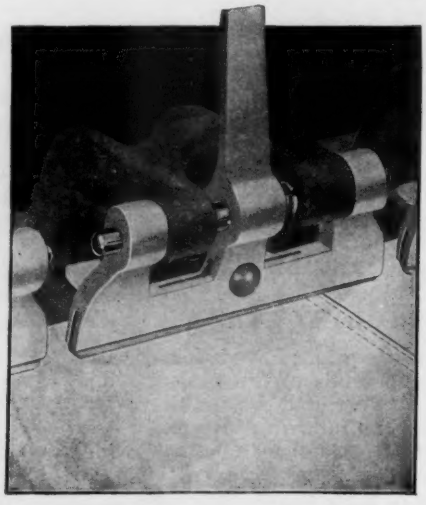
The first illustration shows a Butterworth Vibrating Tenter equipped with patent automatic clamp. This tenter is made any desired length and width and is designed to produce elastic finish on cotton piece goods. The large main driving gear is equipped with a universal joint so that it does not oscillate when the tenter is operating with vibratory motion. Main driving shaft



VIBRATING TENTER

bearings are bronze bushed. Driving end cross arm is of cast steel. This tenter can also be operated as a straight tentering machine when desired.

The illustration below shows delivery end of a straight automatic tenter 60 ft. long, center to center of chain wheels, adjustable in width 12 in. to 65 in., at the entering end; has Foxwell guider, at delivery end rack and



THE NEW BUTTERWORTH CLAMP

gear winder; driven by 15 h.p. variable speed motor 710 r.p.m., speed 40 to 80 yd. per minute.

NEW BUTTERWORTH FOUR-INCH TOP OPENING SELF-ALIGNING TENTER CLAMP

There is a strip of special alloy brass inserted in the nippers of this clamp. This is pivoted in the center so that it will grip rolled selvage or uneven thickness of fabric at the same time.

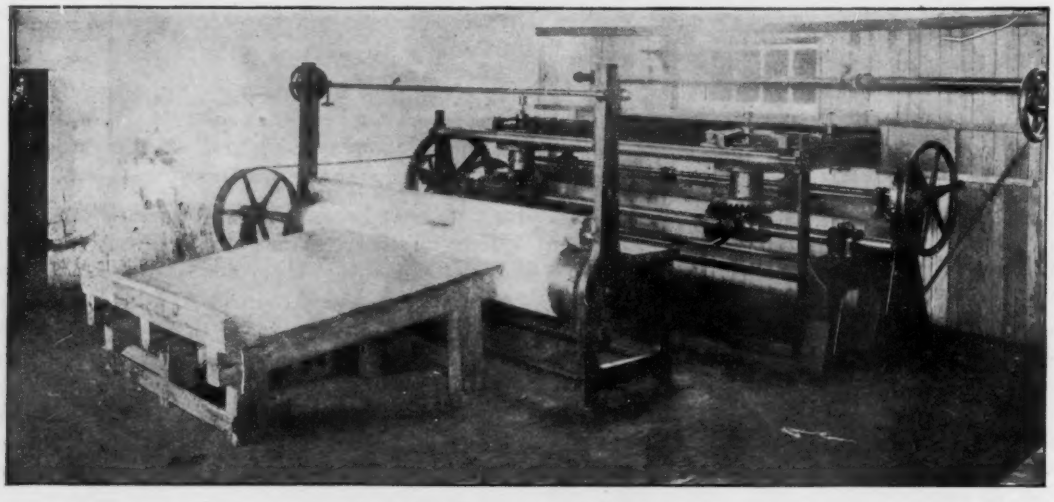
For ginghams or loose selvage goods rollers are used in place of shoe operating the clip.

This new self-aligning clamp can be easily substituted on any tenter, top wood covers, openers and sprocket wheels alone requiring replacing.

Also, nipper arms have been bridged to make them still stronger.

We have a booklet on this self-aligning clamp; when you write, its title is "Accurate Automatic Aligning."

The self-aligning clamp is furnished on all except mercerizing tenters, unless otherwise specified.



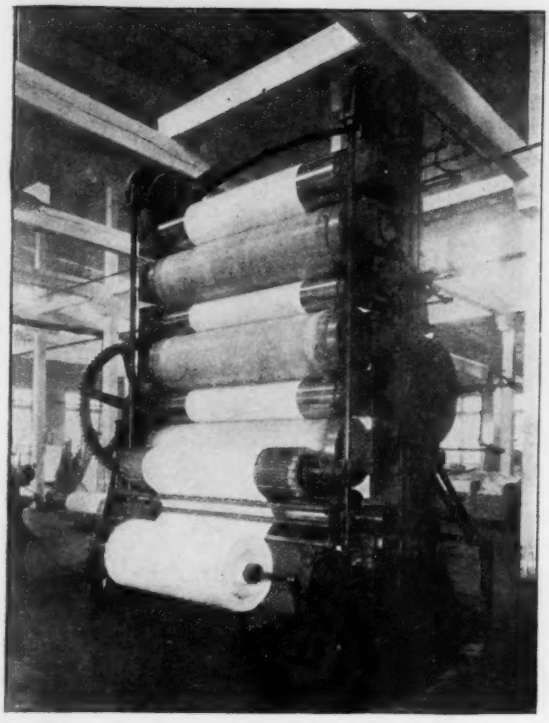
STRAIGHT AUTOMATIC TENTER

Continued on next page

H. W. BUTTERWORTH & SONS CO.

CALENDERS

7-Roll Hydraulic Calender—Heavy open side housings, three (3) cotton rolls each 23 in. dia. x 90 in. face, one (1) chilled iron roll 12 in. dia. x 91 in. face, one (1) chilled iron roll 14 in. dia. x 91 in. face, one (1) chilled iron roll 18 in. dia. x 91 in. face, one (1) chilled iron roll 20 in. dia. x 91 in. face.



7-ROLL HYDRAULIC CALENDER

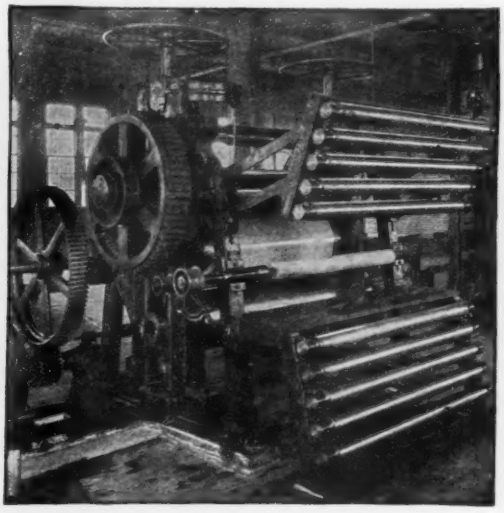
The three top chilled iron rolls arranged to be heated by steam. At the entering side knee brackets with tension bars and Luther stretcher. At the delivery side slip belt winder. Driving by cut gears from G. E. 50 h.p. motor 900 r.p.m.

Hydraulic Embossing Calender—Heavy open side housings, two (2) wool felt paper rolls 23 in. dia. x 90 in. face, one (1) engraved steel roll 11½ in. dia. x 90 in. face, arranged to be heated by steam. Friction let-off and slip belt winder on both sides to allow two pieces of goods to run simultaneously. Driving by double helical gear and pinion and cut spur gear and cloth pinion from G. E. 35 h.p. motor 900 r.p.m.; speed, 20 yd. per minute.

These are but two of the many types of calenders which we manufacture, varying from two rolls to as many as your work may require.

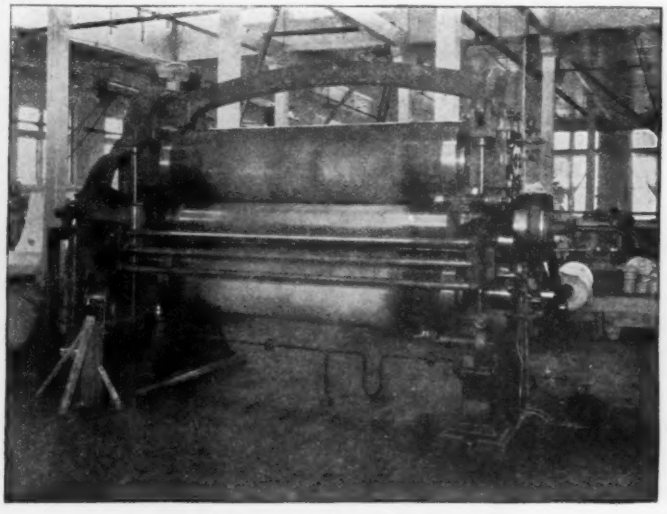
It was recently brought to our attention that a Butterworth Calender, installed in 1859, is still in daily operation.

Friction Calender—Has one bottom charcoal iron roll, 18 in. diameter by 51 in. face; one chilled iron roll 14 in. diameter by 51 in. face, arranged to be heated by steam; one cotton roll 22 in. diameter by 50 in. face; driven by mortise gear and cut pinion from 50 h.p. variable speed motor, 720 r.p.m.; speed 60 yd. per minute.



FRICTION CALENDER WITH CHASING ATTACHMENT

And we might mention here a word about Butterworth Calender Rolls. They are noted for the amount of service they give before requiring refilling. This is due to what goes in them as much as how it goes in—care. We found by experience—long experience—that while cotton rovings do make an absolutely white roll, long, staple cotton makes one that stands up much better; therefore, all Butterworth cotton rolls are filled with this long, staple cotton. Of course, we make all types of calender rolls.



HYDRAULIC EMBOSSING CALENDER

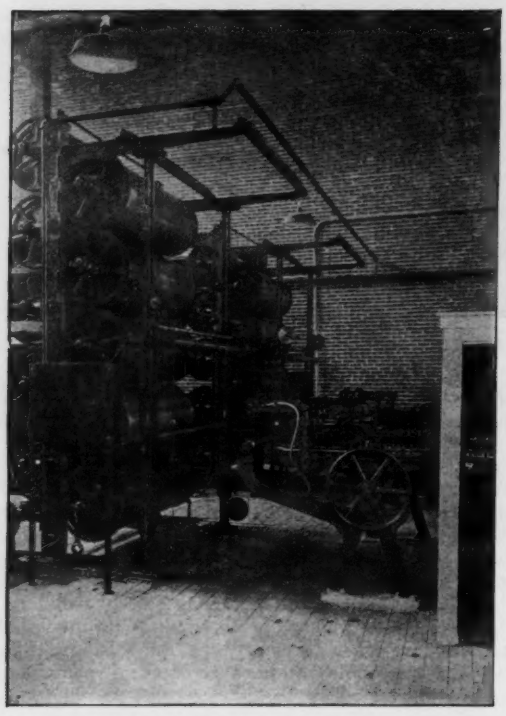
Continued on next page

H. W. BUTTERWORTH & SONS CO.

DRYING MACHINE

In the illustration are Drying Machine, Straight Automatic Tenter and end of Tenter House.

The Drying Machine is arranged on vertical columns having ten (10) cylinders of tinned steel 23 in. dia. x 66 in. face, stuffing boxes equipped with Sharp patented automatic grease cups. At the delivery side a rack and gear compensator. Driving direct by variable speed motor 7½ h.p. 710 r.p.m. with rheostat control. This machine is part of a range, its motor being synchronized with a 15 h.p. motor driving the main unit. Speed 40 to 80 yd. per minute.

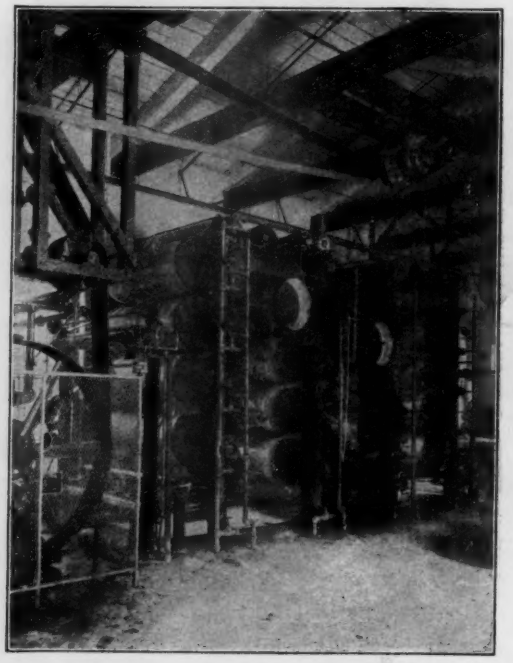


DRYING MACHINE, STRAIGHT AUTOMATIC TENTER AND TENTER HOUSE

Drying machines are made with either vertical columns or horizontal frames to suit your requirements. The cylinders may be of copper or tinned steel and in any width to 144 in. face.

MULTI-CYLINDER DRYING MACHINES

This machine has 41 cylinders arranged on four sets of vertical columns having five cylinders of copper and thirty-six of tinned steel, each 23 in. dia. by 50 in. face, driving by expansion pulley 21 in. to 24 in. dia. by 6 in. face from starch mangle, and by special cone drive; pinions and sprockets to drive from the front to back of machine.



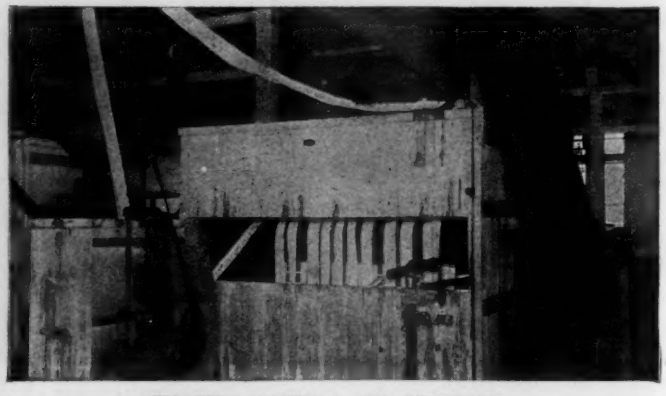
MULTI-CYLINDER DRYING MACHINE

The first five copper cylinders on the back of the first vertical column are arranged as cooling cylinders with the bearing blanked and tapped for water or steam connections as desired.

WASHING MACHINE AND SQUEEZER

Washing Machine—Heavy housings with handwheels, screws and rubber springs having two maple rolls each 20 in. diameter by 120 in. face, also pin rail, pit reel complete with bearing. In the plant where this installation was made, they furnished the pit tank made of concrete.

Water Squeezer—This also has heavy housings, compound levers, screws and handwheels, top rubber covered, roll 18 in. diameter by 22 in. face; rubber covering, 1 in. thick; machine driven by expansion pulley 21 in. to 24 in. x 6 in. face on overhead countershaft to tight pulley on squeezer.



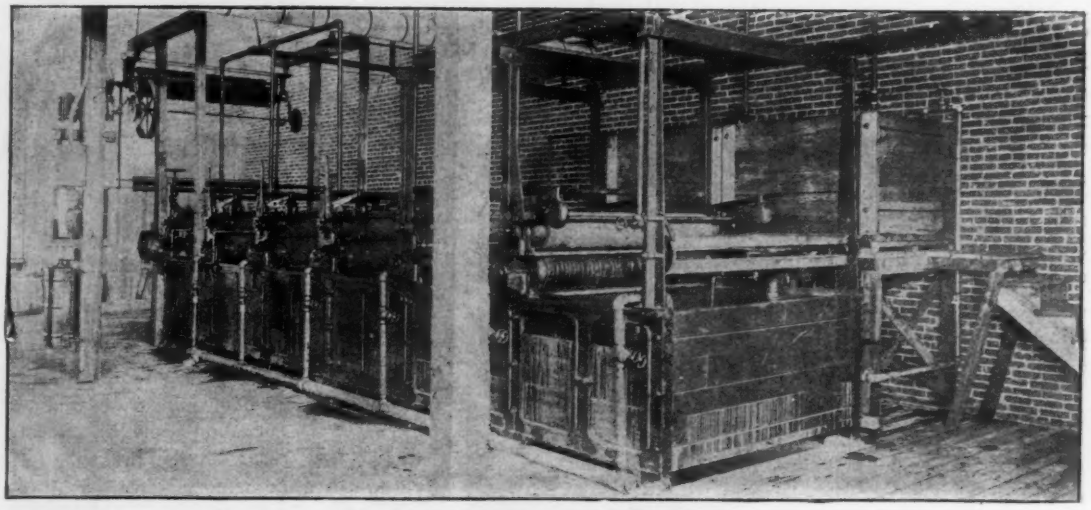
WASHING MACHINE AND SQUEEZER

Continued on next page

H. W. BUTTERWORTH & SONS CO.

DYEING MACHINES

This six-compartment dyeing machine was installed in the plant of a finishing company in Toledo, Ohio. It has cast-iron frames, wood-lined, each compartment being 50 in. long with seven 4 in. outer diameter seamless tube immersion rolls. Brass fittings can not be used inside the box. There are six sets of squeeze rolls, the first five sets in housings with levers and weights, the last set in housings with handwheels, screws and springs. Each set has one top rubber-covered roll 10 in. diameter by 66 in. face (rubber covering ¾ in. thick) and one bottom rubber covered roll 10 in. diameter x 66 in. face (rubber covering ½ in. thick vulcanite). Oxidizing frame with rolls; at entering end, overhead stands with tension bars; at delivery end, plain folder; driven by side shaft with cut bevel gear with Moore and White friction clutch from 20 h.p. constant speed motor, 720 r.p.m., speed 80 yd. per minute.

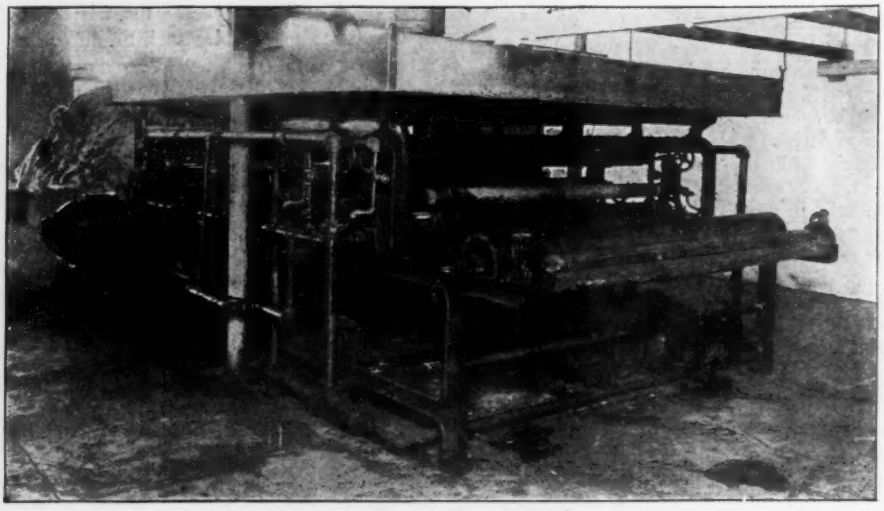


SIX COMPARTMENT DYEING MACHINE

SINGEING MACHINES

The five-burner gas singeing machine illustrated is but one of several kinds of oil and gas singes made by us.

The burners in this one have a 94 in. face. The brass tube water rolls run in roller bearings. Tension bars and counter at entering end. At delivery end is water box with reel. Machine is driven by G. E. form M or similar type motor; 10 h.p., 1200 r.p.m.



FIVE-BURNER GAS SINGEING MACHINE

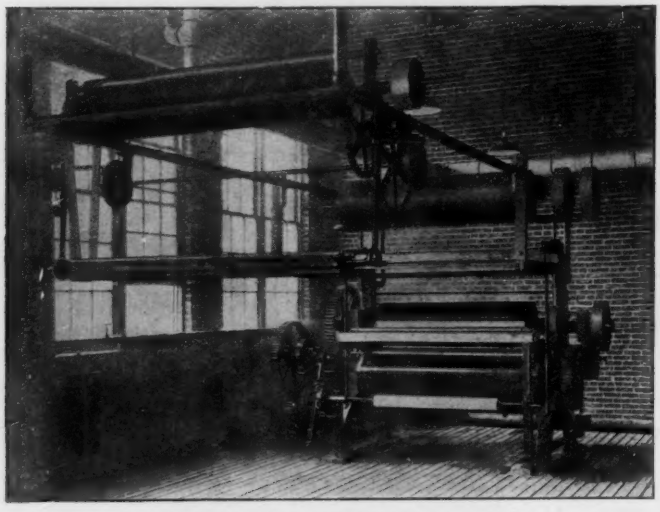
Continued on next page

H. W. BUTTERWORTH & SONS CO.

STARCH MANGLE

Victoria Friction Starch Mangle—Heavy housings, compound levers, screws and handwheels two (2) wood rolls, each 20 in. dia. x 66 in. face, geared together in ratio of 3 to 1: starch box. At the entering side are knee brackets with friction let-off and a set of revolving scroll rolls. At the delivery side is a slip belt winder and a frilling folder. Driving by cut spur gear and Moore and White friction clutch pulley from 20 h.p. variable speed motor, 750 r.p.m. through cut gear and cloth pinion. Delivers 100 yd. per minute.

Frilling Folders, as illustrated above, are made in all widths and can be adjusted to vary the length of folds as desired. They are pulley driven. Folders are made in several styles to suit mill conditions.



STARCH MANGLE AND FRILLING FOLDER

JIGGERS

Shown are several of a battery of twelve jiggers. The frames are cast-iron, wood-lined, each having two rubber-covered beam rolls, 6¾ in. diameter x 66 in. face (rubber covering ⅜ in. thick vulcanite) driven by bevel gears and Carlyle Johnson friction clutch; three 4 in. outer diameter brass tube immersion rolls in box. The jiggers are arranged in two batteries of six each, and are driven from a line shaft and 30 h.p. constant speed motor, 715 r.p.m. Full operating load, 18 h.p.

CATALOGS

In addition to the Butterworth Catalog we also have folders on all the machines described and illustrated here. We shall be glad to send you any information relative to the machines in which you are interested.

OTHER BUTTERWORTH FINISHING MACHINES

Other machines used in finishing silk, wool and cotton, made by H. W. Butterworth & Sons Company and not shown here, are:

Tommy Dodds
Pumping Units for Hydraulic Calenders, etc.
Warp Coilers
Crabbing Machines (Shown on page 79. Wool Section)
Atomizers
Foxwell Guiders
Sizing, Drying and Beaming Machines for Carpets.
Mangles
Ageing Machines
Beetles
Color Kettles and Cell Driers
Finishing Machines for Silks (Shown on page 139, Silk Section)

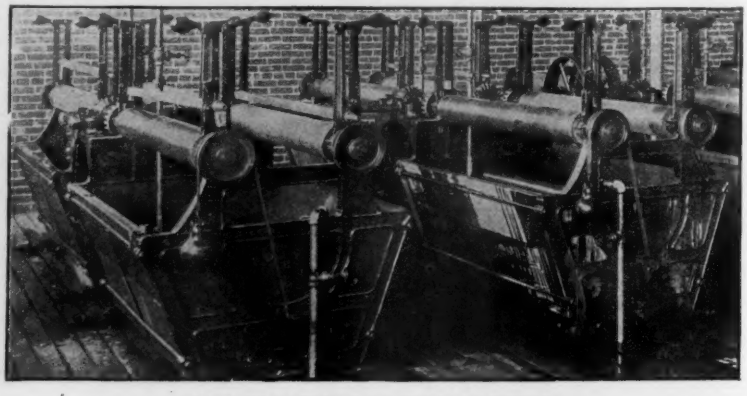
BUTTERWORTH SERVICE

In giving the horsepower required to operate the machines we have illustrated and talked about in these pages, it should be remembered that this will vary with the character of the goods; also while definite machine widths are given, remember that all machines can be made in widths to suit your individual requirements. We are always very glad, however, to offer the services of the Butterworth Organization and all the 103 years' experience behind that organization, in answering any question along individual lines.

And concluding these six pages let us give you a few words of conversation between the superintendent of one of the largest finishing plants in the east and a visitor whom he was "showing through."

"Why do you use practically all Butterworth machines?" the visitor asked.

"Because they require so little adjusting," the superintendent paused, "this takes time you know," he finished.



PART OF BATTERY OF TWELVE JIGGERS

FOR WARP SIZING

Reduces breakage:

Soluble Wheat Starch Binder possesses great penetrating power, and also helps the other ingredients of the size mixture to penetrate, causing every fibre of the yarn to become thoroughly sized. The result is greatly increased tensile strength, and consequent reduction of breakage.

Reduces shedding:

Soluble Wheat Starch Binder "binds" the ingredients of the size mixture to the yarn until each has performed its full mission. This prevents excessive shedding and its incident troubles.

Demonstration gladly given.

Also serving the textile industry with:
"Hawk" Thin Boiling Starch
"Gold Medal" Refined Starch
"Silver Medal" Pearl Starch
"R. A. Brand" Imported Potato Starch

STEIN, HALL & CO., INC.
61 BROADWAY
NEW YORK

BOSTON
PHILADELPHIA

SOUTHERN OFFICE:
CHARLOTTE, N. C.

PROVIDENCE
TROY

QUALITY AND SERVICE SINCE 1866

SAYLES FINISHING PLANTS, Inc.

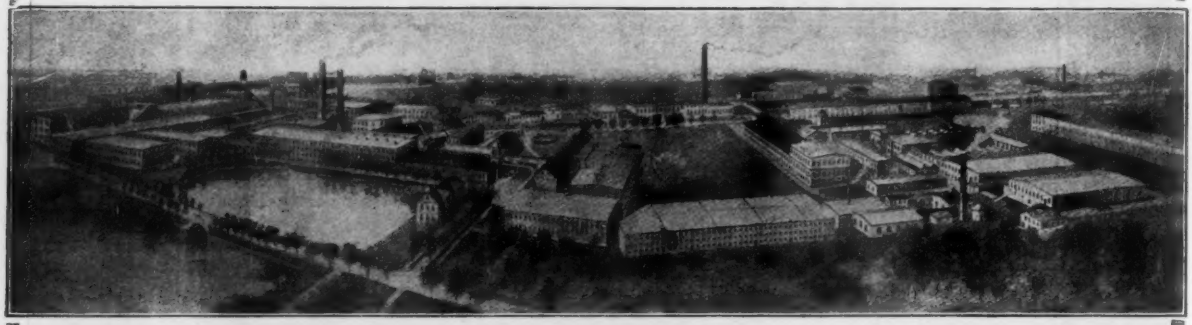
SAYLES BLEACHERIES	SAYLESVILLE, R. I.	PLANT A
GLENLYON DYE WORKS	SAYLESVILLE, R. I.	PLANT B
GLENLYON PRINT WORKS	PHILLIPSDALE, R. I.	PLANT C
GLENLYON YARN DYE WORKS	PHILLIPSDALE, R. I.	PLANT E
GLENLYON YARN DYE WORKS	CENTRAL FALLS, R. I.,	Winding Dept.
NEW YORK OFFICE	72 LEONARD ST., NEW YORK CITY	

SAYLES BLEACHERIES

BLEACHERS AND FINISHERS OF COTTON FABRICS

Wide Sheetings, Shirtings, Lawns, Fancy Dress Goods, India Linens, Nainsooks

ALL WEIGHTS AND WIDTHS



VIEW OF SAYLESVILLE WORKS

GLENLYON DYE WORKS

Mercerizers, Dyers and Finishers of Cotton Piece Goods

Dyers and Finishers of Worsted Dress Goods, Mohair Linings and Cotton and Wool Dress Goods

GLENLYON PRINT WORKS

Bleachers, Dyers and Printers of Fine Cotton Goods and Fabrics of Silk and Cotton

GLENLYON YARN DYE WORKS

Bleachers and dyers of cotton yarn in ball warps and skeins, artificial and natural silk yarns. Colors fast to bleaching a specialty.

GLENLYON YARN DYE WORKS

Winding Department

Beamers, Warpers, Winders and Quillers.

FOR GENERAL INFORMATION

Address

SAYLES FINISHING PLANTS, Inc.

Saylesville, R. I.

"The Hallmark

of Quality"

Color Treatment of Fine Fabrics Planning and Practice--

Upon the origination of theories of unique color application stimulative to market demand, and the development of these theories in actual practice as applied to problems affecting the Dyeing and Finishing of Fine Fabrics, are centered the entire efforts of the U.P.D.W. organization.

A continuous expansion of facility supports the Textile Producer to whom a complete dyehouse equipment, manned by a skilled personnel, represents a prohibitive expense.

The symbol of our service affixes an assurance of excellence.

United Piece Dye Works

DYERS, PRINTERS AND FINISHERS
IN THE PIECE OF

ALL COTTON GOODS
SILK AND COTTON MIXED GOODS
SILK AND WOOL, ETC.

Lodi, New Jersey

New York Office
132 Madison Avenue

Mills
Lodi and Hawthorne, N. J.
Paterson, N. J. Allentown, Pa.

Starch

EFFICIENCY and ECONOMY are the watchwords today. Modern mill men who hold to this motto are discarding ordinary, imperfectly refined starches and selecting those special types best suited for their individual conditions.

Some desire increased weight, all need increased strength and better weaving qualities for the warp.

You know the result you seek.

We know and can provide the proper type of starch.

400 MILL

500 MILL

FAMOUS N

C. P. SPECIAL

BLUE RIVER CRYSTAL

BLEACHING and FINISHING PLANTS have learned that "any old" STARCH or DEXTRINE will not do the work. To secure the proper "feel," the desired weight and the attractive finish, careful discrimination must be exercised in selecting

STARCHES and DEXTRINES.

We manufacture all approved varieties

90 THIN BOILING CRYSTAL

162 GUM 163 GUM

DEXTRINES and BRITISH GUMS

Corn Products Refining Company

New York

Southern Office *Greenville, S. C.*

Starch

MATHIESON Chemicals

"Deal Direct with the Manufacturer"

THE phrase is an expression of our direct responsibility for the quality of Mathieson Chemicals wherever sold.

This direct responsibility exists whether "Eagle Thistle" products are specified in carload or less-than-carload quantities, for shipment from our works or from our consigned stocks in the hands of local distributors. There is never any middle-man with whom our responsibility is divided.

"Deal Direct with the Manufacturer" has a vital significance to you. It stands for the elimination of uncertainties in price and delivery as well as in quality.

The MATHIESON ALKALI WORKS Inc.
25 WEST 43rd STREET NEW YORK CITY

PHILADELPHIA
PROVIDENCE

CHICAGO
CHARLOTTE

EAGLE THISTLE PRODUCTS

Deal Direct with the Manufacturer

Bicarbonate of Soda
Liquid Chlorine-Caustic Soda
Sesquicarbonate of Soda
Bleaching Powder-Soda Ash

UCPC

ANILINE COLORS

DIRECT, SULPHUR, ACID, BASIC AND CHROME
including the following new Product

BRILLIANT SULPHUR BLUE T. C. M. CONC.

THE BEST MONEY VALUE BLUE FOR CHAMBRAYS

VELVETEEN PASTE

THE STANDARD BOIL-OFF & DYE BATH ASSISTANT

U. C. TALLOW

THE HIGHEST GRADE OF PURE SIZING TALLOW

KING BRAND SIZING

OUR "K.B." IS A COMPLETE SIZE IN ITSELF. HIGH IN TALLOW

WAX SOFTENER

A SCIENTIFICALLY BLENDED SOFTENER FOR BLEACHED GOODS

UNITED CHEMICAL PRODUCTS CORPORATION

York and Colgate Sts. . . . . Jersey City, N. J.

Southern Office, Commercial National Bank Bldg., Charlotte, N. C.

REPRESENTATIVES: R. T. GRANT, Charlotte, N. C.
GEO. W. WATSON, Hazlehurst, Miss.
C. D. MAIGATTER, Charlotte, N. C.
B. M. LATTIMORE, Shelby, N. C.

Staley's

Expert Staley Service has improved quality and reduced cost in thousands of textile products.

First, a detailed analysis is made of individual mill conditions and manufacturing requirements. Second, a special starch is compounded for each particular need.

Scientific laboratory facilities, and the most advanced production methods assure absolute maintenance of original specifications in each starch employed.

You, too, can benefit by the application of scientific Staley methods. A member of our consulting staff will be glad to call.

A. E. STALEY MFG. CO.
DECATUR, ILLINOIS

508 Andrews Law Bldg.,
Spartanburg, S. C.
G. A. Dean, Manager

Ansley Hotel,
Atlanta, Ga.
J. W. Pope, Manager

25 Church St.,
New York City
W. H. Randolph, Manager

88 Broad St.,
Boston, Mass.
L. R. Dickinson, Manager

Starch

Hydroxy Art Silk Coning Oil

A Specially Prepared Oil

Used in the Coning, Winding, and Knitting of Artificial Silk

Makes Artificial Silk Knit Smoothly.
Eliminates Breakdowns. Reduces Seconds.
Washes out easily at low temperature.

Therefore—
Dyeing and Bleaching is even and shades brighter.

Sample sent on request—no charge.

Developene (There Is no "Just as Good")

Makes a rusty Black stocking turn deep Black.

Kali Chlorine Neutralizer

An Anti-chlor—prevents tender bleached goods.

All chemicals for the Dye House—
All oils—Sulphonated—Turkey Red—
Neatsfoot, Olive, etc.

KALI MANUFACTURING CO.

1410 No. Front St., Philadelphia, Pa.

Sole Manufacturers of "Hydroxy Oils" Patented.

Douglas Crown Starch

A thin boiling starch for sizing yarns and fabrics

Free from all impurities and foreign material, Douglas Crown Starch is especially adapted for sizing yarns and fabrics. Unlike the ordinary method, Douglas Crown Starch is manufactured by a special process. First it is refined, then dried in large rotary vacuum driers under low temperature, thus eliminating crustings and cooked particles. It is a refined thin boiling starch —essentially the most perfect textile starch made.

Backed by years of successful use. You will appreciate its superior working quality.

In addition to Douglas Crown, we manufacture a full line of starches —all made by our special process.

DOUGLAS CROWN STARCH (a refined thin boiling starch)
DOUGLAS PEARL STARCH
DOUGLAS POWDERED STARCH
DOUGLAS WARP SIZING STARCH
DOUGLAS LION MILL STARCH

Our representative will promptly supply samples and full information. Write to

PENICK & FORD, Ltd., Inc.

Manufacturers of Corn Products

CEDAR RAPIDS, IOWA

or to any of the following offices:

New Orleans, La.
Montgomery, Ala.
New York, N. Y.

Southern Representative
G. L. Morrison
Greenville, S. C.

N. E. Representative
Marble-Nye Company
Boston and Worcester, Mass.

If You Go to the Textile Show—

Be Sure to See

The "NATIONAL" Exhibit

Of Practical Value to Mill Men—that is the keynote of the "National" Exhibit at the Eighth International Textile Exposition, to be held in Mechanics Hall, Boston, October 29th to November 3rd.

In the "National" Booth—Spaces 502, 503, and 504, you will find, of real interest, a display of

Mill Dyed and Printed Textiles,
including:—

Dyed Loose Wool

Yarn Dyed and Piece Dyed Woolen and Worsted Fabrics

Direct Dyed, Direct Printed and Discharge Printed Cottons

Dyed Natural and Artificial Silk in Skeins and on Spools

—all dyed exclusively with "National" Dyes—all produced in well known mills. Samples of these textiles, with information as to the dyes used, will be available to you.

The Exposition Number of "DYESTUFFS"—to be distributed at the Show,—will contain original and valuable articles on the dyeing and printing of the various textiles exhibited. Every mill executive and dyer should have a copy of this issue.

The "National" Exhibit will not be a display of dyes, but will consist of an assortment of textiles of the highest type, illustrating the present day application of "National" products. Be sure to visit the "National" Booth—if you see the Exposition—if not, write for a copy of the Exposition Number of "DYESTUFFS."

NATIONAL ANILINE & CHEMICAL COMPANY, Inc.
40 Rector Street, New York, N. Y.

NATIONAL U.S.A. DYES

COTTON

Published Monthly by

W. R. C. Smith Publishing Co., Dalton and Atlanta, Ga.

L. L. ARNOLD, Editor. **R. W. PHILIP, Associate Editor.**

Editorial and Advertising Departments, Grant Building, Atlanta, Ga. Subscription price, $1.00 per year; Canada, $1.50 a year; Foreign, $2.00 a year. Entered at the Dalton, Ga., postoffice as second-class matter.

Contributions to the columns of Cotton are solicited and paid for after publication. The name of contributors need not necessarily be used, but must accompany all manuscripts.

Orders for any change in advertising must reach Atlanta previous to the tenth of the month preceding month of issue, otherwise publishers cannot be responsible for changes.

When changing address, notify us, not the postmaster. Always give the old address as well as the new one.

Volume 87 **Member Associated Business Papers, Inc.** **Member Audit Bureau of Circulation.** **Number 12**

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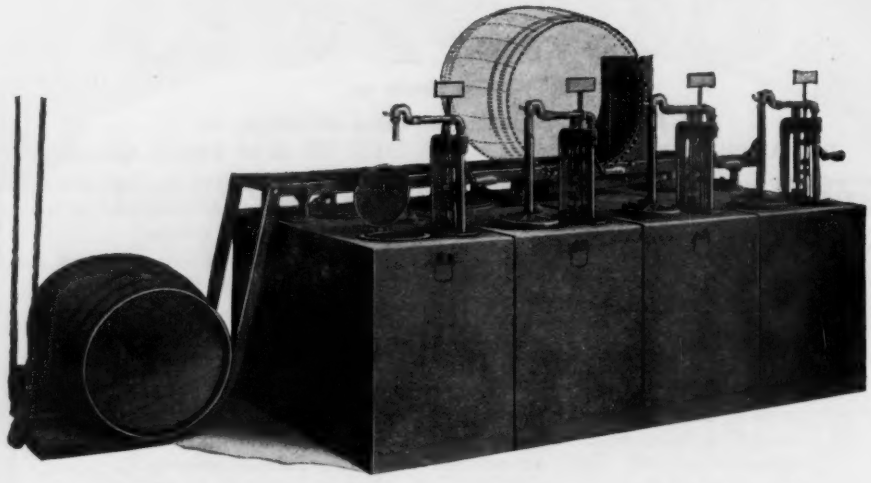


Cut 12. First Floor Battery Outfit with Single Acting, Quart Measuring Pumps.

How to Increase Earnings

One way is to increase the business—another way, one that every efficient plant is trying to accomplish, is to *decrease expenses.*

Mills, factories and machine operators are just beginning to realize the big saving that can be made in the *proper handling* of their oil supplies.

Over 10 per cent has been wasted through dripping, spilling, leakage, deterioration and failure to completely drain barrels. The time of help and machines has been lost because of inconvenience in handling the oil. The insurance rate has been higher and a very material saving has been lost by not buying in bulk.

American Lubricating Oil Storage Systems

prevent every one of these wastes and losses and gives you *better, cleaner* oil. The saving *pays for the equipment* in a short time.

A battery can be furnished of just the number of tanks you require. Each tank is fitted with a measuring pump having an anti-drip nozzle, giving exact quantities wanted without waste.

The material and construction of these outfits are of the highest order and fully guaranteed.

Write us for Bulletin No. 203 and let us figure on a system exactly suited to your requirements.

Cut 90 Outfit Pump with Meter Attached

A clean, convenient manner for delivering oil into containers in exact quantities. Fitted with door and lock on both pump and cabinet. Capacity one barrel. A safe and sanitary method of handling oils in the different departments throughout the plant.

Ask For Bulletin No. 44

The American Oil Pump & Tank Company

1179 FINDLAY STREET, CINCINNATI, OHIO

Quotations Furnished on Special Oil Tanks for Holding Any Quantity From 100 Gallons to Car Load

With the Publishers—

The Viewpoint of a Reader

The following communication from the superintendent of a New England mill presents the subject of advertising from the angle of the reader.

To explain briefly, this reader described a device in the "How Other Men Manage" department, told how useful he had found it, and commented on the somewhat strange fact that the manufacturers of this device failed to advertise its merits.

The succeeding issue of COTTON carried an answer to this reader in the form of an advertisement, to which he now responds.

Editor Cotton:

On page 692 of the June issue of COTTON, I find the following advertisement:

"Answer to 'Wash (R. I.)'"

"'That it is not advertised is very strange indeed.' 'Wash' must have overlooked our advertisements in some of the textile papers. Owing to the overwhelming demand for this device we were compelled to discontinue our advertising in order to catch up on orders."

As I have before stated, my first letter to this department was written in the year 1913, and this is the first time any of my articles have been answered in the advertising columns. So no one can put me down as working for the advertising department of COTTON.

When I described the device of this company in the May issue of COTTON, I had only one object in mind, and that was, I wanted the boys to get the benefit of this device. I was fair with the Bahan Textile Machinery Company, more so, I think, than they are to themselves when they state:

"Owing to the overwhelming demand for this device we were compelled to discontinue our advertising in order to catch up on orders."

Is it not a fact that no other concern could fill these orders? Therefore, I fail to see where they were **compelled** to stop advertising, for I know customers are willing to wait for any device that is beneficial. Again, when they are caught up on orders, what then?

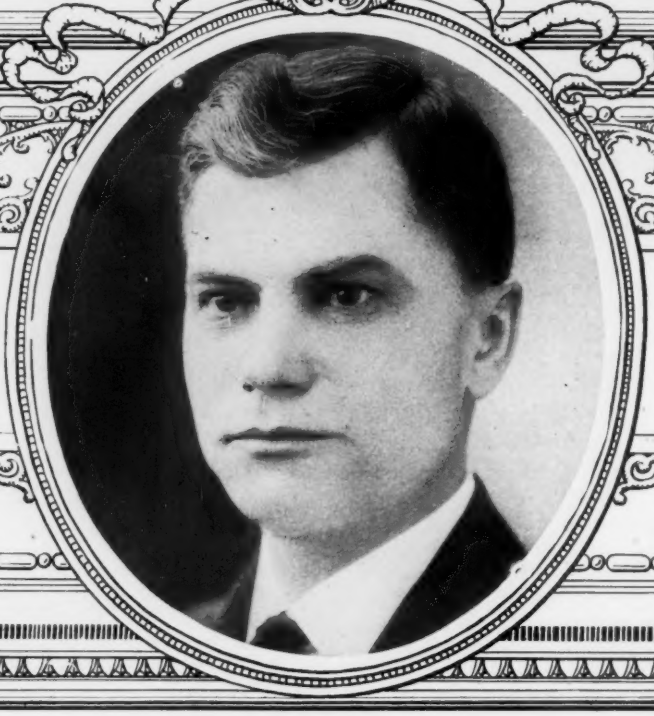
Why are so many men in this world troubled with nervous prostration? They don't get in such a state by pushing their business; the trouble is caused by their business pushing them.

I want to take this opportunity to say something which is a credit to those in charge of the advertising department of COTTON and to COTTON itself:

While I was superintendent of a New Hampshire mill, the representative of a concern making reeds and harnesses made the following statement to me: "My people tell me that each time they fail to advertise in COTTON, they notice a change in the amount of business done. So, as far as I know, our ad is standard."

Wash (R. I.)

AMONG COTTON'S READERS



E. T. Saulnier, Superintendent,
The Boston Manufacturing Company
Waltham, Massachusetts

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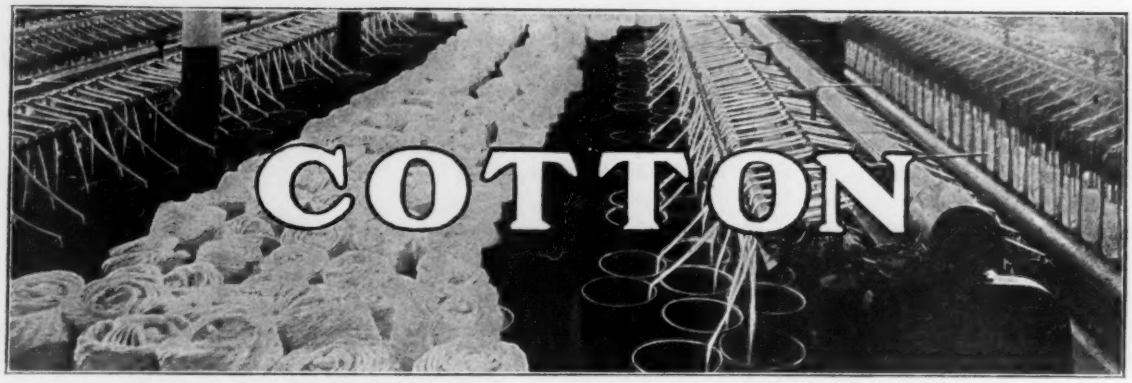
E. T. Saulnier



October, Nineteen-Twenty-Three

The Strike Fever Wanes.

Two or three years ago it looked as if the country was on the road to being engulfed by chaos due to a raging and growing strike fever among working men. Thoughtful persons, however, did not share the alarm, despite recurring threats of famine on account of the cutting off of food distribution through national railroad strikes which several times seemed imminent, and the walking out of all or most of the coal miners.

Subsequent events have justified those who took a calm view of the strike epidemic which swept the country during the latter days of the war and for two or three years following the armistice. Though the time probably is far distant when it can be announced that there will be no more big strikes, statistics show that as the hysteria of war time recedes, labor troubles, particularly of the kind represented by cessation of operations on account of strikes, are less numerous and formidable.

In fact, in 1922 fewer strikes occurred throughout the United States than during any year since 1916, and the figures for this year no doubt will show a further decline. If they do, the showing will be more significant than that for last year. During 1922 there was considerable unemployment; so far this year there has been little. And it is traditional, for it is natural, that the strike fever usually registers highest when labor is in greatest demand and when wages are tending upward rather than downward. This was shown during the war, even in 1917 and 1918 when there was every patriotic reason for the avoiding of strikes and when machinery, with tremendous moral force beyond it, was set up for seeing that workers received all that was due them and more.

Hence, this year's comparatively good record in the matter of labor troubles would indicate that a force making for industrial peace has been at work and is getting much desired results.

In truth, many forces have been working mightily in this beneficent direction. One, no doubt, is a growing realization among workers that whatever the seeming victories they win through striking they ultimately and inevitably lose. This can be positively demonstrated. But they not alone lose; everbody loses, most especially the public which in the end pays the bills. And the employer and employee are parts of the public.

The biggest force operating towards the bringing of labor disputes within the range of reason is that greatest of all general forces, public opinion. Twenty years ago public opinion always could be depended on to take sides with the strikers in any case; now it probably takes the part of neither side in most cases—being merely opposed to strikes.

And perhaps the most singular attribute of the situation is that the public has set up virtually no instruments of force for carrying out its will for industrial peace. The railroad labor board is the nearest thing we have to a national tribunal for preventing strikes by forcing the settlement of disputes along orderly lines and through juridical channels. Yet it has no punitive power. But its actual power is now so great that no informed observer ever again expects to see serious threats made to starve the nation through tying up the railroads, as seemed imminent two or three times during the last ten years.

And we probably have seen the last national coal strike. The readiness with which all sides in the recent anthracite embroglio compromised their differences along the lines of Governor Pinchot's suggestions showed that they, and particularly the miners, were afraid of a coalless public.

Figures collected by the U. S. Bureau of Labor Statistics show that last year only one-half as many strikes occurred as in 1921, less than one-third as many as in 1916, and only about one-fourth as many as in either 1917 or 1918. They show also that wages, while the leading, is the sole cause of only a relatively small proportion of strikes, usually no more than one-third of them. The results of strikes in recent years also yield figures that to many will be surprising. In 1916 about an equal number for each result ended in victory for employers, and employees and by compromise. But employers' victories were greatly in the minority during the succeeding three years. In 1920 the employers won nearly twice as many as did employees, or as ended in compromise. In 1921 the employers won more than were won by employees and compromised In 1922 the results were fifty-fifty between complete victories for either group, with a smaller proportion than for any year in the period covered ending in compromise.

The record shows also that strikes are much more likely to occur in Spring and Summer than during the Fall or Winter months. Striking fever rages highest apparently during April and May, when ordinarily two to three times as many strikes occur as during October and December. The bureau explains this on the ground that a

AMONG COTTON'S READERS

E. T. Saulnier, Superintendent,
The Boston Manufacturing Company
Waltham, Massachusetts

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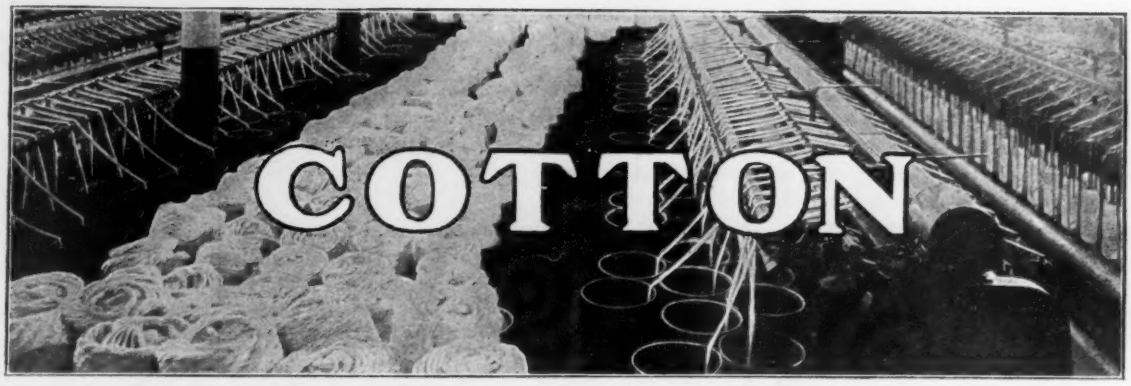

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larger proportion of wage agreements end during April and May than during winter months; no doubt, however, there are other reasons.

The figures indicate that women workers are much less susceptible to strike fever than are men. In 1922, for example, the bureau received reports of only 21 disputes in establishments employing women alone, while there were 644 which involved only men. The difference is much greater than the disparity between the number of places employing either men or women workers exclusively.

Figures arranged by states show those of the East to lead in labor disputes, while the southern states apparently have fewest. For cities, New York has many more than any other. The large cities as a rule have many more than their population ratios entitle them to.

But the significant fact made clear by the figures is that the industrial strike is, for the time being at least, greatly on the wane in this country.

The Presidential Change.

To say that the recent tragedy in national public life, which led to a new President taking charge overnight, was providential is only to state a fact. That is, it was due to an act of God.

It reflects not on the geniality, the likableness, and indeed the considerable success achieved by the late Mr. Harding as President to say that in other senses the tragedy which so saddened the nation was providential.

Mr. Harding had reached and perhaps passed the apex of his popularity and, maybe, his success as head of the nation. He was not an ambitious man; therefore, he was no egotist. His desire was to be known as a good rather than a great President, to be remembered as a man rather than to establish a legend of statesmanship. It may seem a left-handed compliment to say of him that he made a much better President than was expected of him, but there is no doubtful quality in the statement that he never let his personality as a man be submerged by the office he held and in many ways adorned.

But the Fates did not bode well for Mr. Harding's future at the White House. He was entering upon the time of "hard-sledding"—ahead of him were the difficulties that come to every President after his best patronage has been dispensed, after the public becomes accustomed to him, and his critics have ferreted out his weaker spots.

Circumstances were such that he would have been compelled to run for re-election; yet he undoubtedly had no personal desire to remain for another term in the White House. Circumstances also were such that he would have had most intense opposition, a stronger opposition perhaps than now can be developed against any candidate his party may name. A hard campaign would have been very painful to him and, despite his lack of ambition, he was of such a nature that defeat would have saddened him probably more than in the case of any man who has been President in recent times.

And defeat was not beyond the probable. This was not because of Mr. Harding, but because of a complex mass of circumstances he neither was responsible for nor could control.

Thus, strange as it may seem, the national political situation has been cleared up considerably by the change his death suddenly brought about. Apparently there now will be less discussion within Mr. Harding's party than seemed impending a few months ago. It seems more probable now that the campaign of next year will revolve around issues of a more constructive and fundamental nature than otherwise would have been the case. Instead of the campaign being demoralized by factionalism, it now can be fought out along truly thoughtful lines. At present it would seem that personalities will count for less in the combat than at any time since Bryan and Roosevelt caused this factor to be all but the predominant one in shaping the currents of national political discussion.

Mr. Harding was a lucky man, like Kipling's hero in "The Light that Failed" he no doubt was lucky even in his untimely death.

He is succeeded in office by another man whom luck always has favored.

Historically, luck has been against all Vice-Presidents whom death advanced to the Presidency, Roosevelt alone excepted.

Coolidge may be another exception; this certainly has been the case during the short time to date that he has occupied the White House.

INTANGIBLES IN MANUFACTURING

A Series by

Frederick H. McDonald.

The Profits in Distinctiveness.

Staple articles, such as yarns and cloth can always be sold somewhere, at some time. The demand is enormous.

But in a field of this kind, the supply is equally as enormous. A low margin of profit seems inescapable.

The problem is to lift a given manufacturer's product out of the ruck of the average, and to provide some reason, however small, for its choice out of the maze of just-as-goods.

Utility, service, sometimes appearance, and always price, are the controlling notes in the siren song of the salesman.

Give him a yarn a little smoother or a little stronger; a cloth with a construction or a finish that makes it better for some particular use than any other; or make up a knitted garment that is seamless where others are held together with corded nuisances—and the world buys it at a good price to the maker.

The amount of oratory necessary to sell an article is inversely proportional to its distinctiveness. "There's a Reason" means money in the till.

By one stroke the manufacturer can provide them both.

Humidity and Efficiency

The Results of Some British Investigations on the Effect of High Temperatures and Humidities on the Output of Workers

BY W. HAMILTON GORDON.

The question of humidity in cotton weaving sheds and its effect on the workers is one which has been exciting a considerable amount of interest in Great Bristain of late years, where, in 1914, a committee was appointed by the Board of Trade and issued a report on the subject. No denial of the assertion that atmospheric conditions govern to some extent the efficiency of the person manually engaged in an industry, where there is any variation from the normal in this respect, may today be expected. Rather is there an increasing tendency to regard such variations as having a most considerable effect indeed and many able investigators in England have added to our store of knowledge of this question during the past two or three years. It is to the interests of the manufacturers that such research should be carried on. Improvements in industrial conditions have meant increased efficiency of the workers and, though such improvements primarily mean increased outlay, where output is permanently increased also the manufacturer is in position to congratulate himself on combining humanity with business acumen.

Conditions in the American textile industry may not be exactly on all fours with those usual in England. Nevertheless, the conclusions arrived at after investigation by Dr. Vernon, of the British Industrial Fatigue Department, should prove of interest to American textile men.

It is usual in textile works, as my readers will know, where the weaving of certain qualities of cotton and linen goods is being carried on, for the process to be carried out in an atmosphere artificially humidified and of a more or less high temperature.

Certain experiments carried out on behalf of the Board of Trade committee referred to above demonstrated that the higher the temperature and the greater the humidity the fewer were the breakages of warp threads, while the amount of cloth woven in a given time was greater. The experiments were summarized in a table, as follows, which gives the average results, the "Time occupied" column showing the number of minutes necessary to complete the weaving of the unit length of cloth which was taken:

WEAVING OF CAMBRICS (Fine).

On Basis of Temperature.				On Basis of Difference Between Dry and Wet Bulb Temperatures.			
Wet Bulb Temperature (° Fahr.)	Difference Between Dry and Wet Bulb (°Fahr.)	Warp Breakages	Time Occupied	Wet Bulb Temperature (°Fahr.)	Difference Between Dry and Wet Bulb (°Fahr.)	Warp Breakages	Time Occupied
61.6	1.5	11.3	52.0	66.0	1.1	6.3	47.5
64.0	1.7	11.1	54.0	66.0	1.4	7.4	45.4
65.7	1.5	7.3	47.6	67.0	1.6	6.8	46.1
68.5	1.6	7.6	46.0	64.6	1.7	9.8	50.2
72.0	1.7	6.3	42.0	68.0	2.2	13.3	60.0

Humidity and high temperature, though they may be an excellent aid to the production of the material, are uncomfortable conditions for the worker and, in proportion to their magnitude, exercise a deleterious effect on his physical condition. Therefore, the committee recommended that in no case should the manufacturers be allowed to artificially humidify the air when a wet bulb temperature of 80 degrees F. had been reached and also that the wet and dry bulb temperatures should differ by at least 2 degrees. Results were obtained from a considerable number of weaving sheds and an average taken from these demonstrated that, during the summer, for about 60 per cent of the time worked, the temperature shown by the wet bulb exceeded 70 degrees, while it exceeded 75 degrees for about 30 per cent of the total hours worked and 80 degrees for about 5 per cent.

H. C. Weston, reporting on atmospheric conditions in the linen industry, has stated that in the two sheds, into the conditions of which he made an investigation, there was a practically constant humidity which equalled 88 per cent saturation and he found that the output of the operatives varied in proportion with the temperature shown by the wet bulb. Taking the case of a loom running continuously and calling the maximum output possible 100 per cent he ascertained that the usual standard of efficiency was about 60 per cent of the possible and that, for each rise or fall of temperature shown on the wet bulb of 1 degree, it rose or fell approximately 1 per cent. When, however, the wet bulb temperature exceeded 75 degrees the output decreased as the temperature increased. He gave a concrete example from one shed where on three consecutive afternoons the temperature showed averages of 74.1 degrees, 75.6 degrees and 74.8 degrees respectively; in each case he found the efficiency less than in the corresponding mornings. The temperatures in the mornings had averaged 68.9 degrees, 69.0 degrees and 69.3 degrees and the loss of efficiency in the afternoons was, respectively, 3.3, 1.8 and 1.6 per cent. Not only was there this immediate reduction in the output of the weavers but the result was still noticeable the next day, for the intervening night had not the effect of restoring the men to their normal condition after being subjected to this trying temperature. He found that, on the day after, their efficiency averaged 0.8 per cent less than on the first day, whilst the result continued even further and there was even an average reduction of 1.3 per cent on the third day.

The question then arises as to what is the best remedy for this state of affairs. A solution must be sought which allows the atmospheric conditions for the production of the weft in the best possible manner to exist and yet have as little deleterious effect on the energy and working power of labor as can be arranged. To arrive at this solution further experiments, both in the laboratory and in the sheds, will be necessary, but there are certain general conditions which must be observed. Science tells us that the deleterious effects which hot and humid air exerts on the human body result from the retardation of the normal loss of body heat which is always going on with every one of us. Where artificial retardation of this kind is going on there are two

immediate ways of checking it, both quite simple. One is to decrease the amount of clothing worn; the other is to increase the volume and velocity of the air currents which are directed against the human body. The question of clothing is, of course, a personal question and it is rather a difficult matter to make it the subject of regulations in a factory because there are always likely to be some obstinate people who will raise objections to any change indicated, but it certainly is the case in the British textile industry that the hands very frequently wear too many clothes when at work. It is suggested that they might change into very thin clothes when they arrive at the mill though, at present, there are not usually facilities which would allow of this course being followed; the provision of these could, however, be arranged by the management and any expense incurred in this way would be eventually repaid in the shape of increased output resulting from the working normality of the operatives.

The second suggestion can be weighed and examined from the scientific side, as it is a matter of pure science. An instrument named the "kata" thermometer has been invented especially for the purpose of taking observations of cooling power. The way this instrument operates is as follows: Body temperature is normally within the range from 100 degrees F. to 95 degrees F. and the rate of cooling of the temperature is tested by this thermometer with the bulb dry and also with the bulb wet, in the latter case the bulb being covered with wet muslin. With the bulb dry there are two factors which, taken together, affect the rate, and these are the temperature of the air and the velocity with which the air current strikes the bulb. These factors work in the following way: Suppose it is required that the cooling power of the air be 6, the dry bulb must show a temperature of 65 degrees and the required velocity be 21 feet per minute; if the temperature is 75 degrees, the velocity must be 94 feet per minute; if 85 degrees, the velocity has to be 455 feet per minute. One condition has to compensate the other. Turning to the use of the wet "kata" thermometer we find a third factor entering into the problem and this is the decrease in temperature which results from the water evaporating from the bulb's surface. This latter factor is usually much more marked in its cooling effect than the other two and the inventor of the instrument, Leonard Hill, considers that while a fairly well ventilated factory should have at least a dry "kata" cooling power of 6, this figure should be 18 when measured by the wet bulb. Thus it appears that the difference between 18 and 6, i. e., 12 units, is the cooling power which should result from the evaporation of moisture.

Some observations were made with this instrument on the cooling power of air in weaving sheds by Weston. When the dry bulb temperature varied from 68.2 degrees to 71.9 degrees he found that the dry "kata" cooling power varied from 5.6 to 4.9, whilst the wet bulb gave the cooling power as ranging from 15.5 to 14.1. It seems possible that these were exceptional cases, for another series of tests made by a different investigator showed that, during the summer, the dry "kata" cooling power ranged from 3.8 to 4.7 whilst the wet "kata" cooling power stood between 12.0 and 14.2.

However, whatever may be the average figure, there is no doubt that it is too low and if it could be raised the efficiency of the workers would be considerably increased. The question is, therefore, how can this be most conveniently done? Calculating the air velocities from the two sets of figures given in the preceding paragraph it was found that they correspond to an average of 25 feet and 26 feet per minute respectively and these figures take in both summer and winter.

In the course of another investigation unconnected with the textile industry—for it covered conditions in 35 shoe factories—an average mean velocity of 35 feet per minute in winter and 37 feet in summer was obtained. The question of overheating does not enter largely into the shoe industry so if there had been a low air velocity it would not have been an important matter. The contrary is the case in many weaving sheds and, although it is not done, an extra amount of air movement should be provided to compensate for this.

Consideration of this subject has not yet been adequate enough to allow of any hard and fast rule being laid down as to what wet and dry "kata" cooling powers ought to be always existent in weaving sheds, but they are undoubtedly too low both in summer and winter. The air movement should, therefore, be increased in all humid cotton weaving sheds, though the manufacturers may raise the objection that increased ventilation may have a tendency to dry the yarn and cause more breakages. Such breakages would probably only happen to a limited extent if the difference between the wet and dry bulb temperatures only amounted to 2 degrees, but in such case it is suggested as a better provision that the regulation stipulating for a difference of 2 degrees temperature-difference should be cancelled and be replaced by one which would lay down that the velocity of the air currents passing through the shed must be in excess of a certain agreed figure.

This 2 degrees difference between the wet and dry bulb temperature is of service because it helps to prevent the worker's clothes from getting damp by the deposition of moisture from the air. However, if the temperatures were the same, and the air was saturated with moisture to the full, all cooling of the skin surface by evaporation of moisture would not follow as a result. The usual temperature of the skin is but a few degrees below that of the body (98.6 degrees F.), and thus perspiration will evaporate at a rapid rate in saturated air even if the temperature of the latter is over 90 degrees.

Tests made with the "kata" thermometer appear to indicate that the loss of heat by evaporation of moisture is not greatly decreased where the air is moist, and it may be asked, why is it then that the weavers so strongly object to air being artificially humidified? As long ago as 1906 a ballot of weavers was taken in Blackburn on the question whether "steaming" should be abolished or not and 68,154 voted for its adoption, 3,094 voted against, whilst 1,221 declared their indifference either way. It may be because that when the air is artificially humidified perspiration tends to collect on the skin and make the clothing damp. Where the clothing worn is heavy—which, as claimed before, is often the case—and cannot be changed directly after work, this condition naturally sets up considerable discomfort, and the best alternative for this would be that the workers should be able to change their clothes immediately before and after work.

Medical evidence indicates that bodily discomfort begins at an approximate temperature of 70 degrees, shown by the wet bulb. The dry bulb, according to the present regulation, should then show 70 degrees, and working out the dry "kata" cooling power we get a figure of 5.0 if the

air velocity is 28 feet per minute. If we assume that 5.0 is the minimum cooling power allowable, the following table shows to what extent the air velocity should be increased with wet bulb temperatures of 75 and 80:

Dry Bulb Temperature	Wet Bulb Temperature	Dry Kata Cooling Power	Air Velocity Per Minute
72°F.	70°F.	5.0	28 ft.
77°F.	75°F.	5.0	68 ft.
82°F.	80°F.	5.0	173 ft.

Should the increase in the air velocity by means of ventilation be found to have a deleterious effect on the quantity and quality of the cloth woven, it may be that a difficulty could be overcome by installing some system whereby the ventilation was entirely local. Wyett made a test, in an investigation he carried out, by causing to be attached to the head roller of a loom a three-inch strip of canvas. This forced the air on to the weaver, and tests with the thermometer showed that the dry "kata" cooling power of the air surrounding him was increased from 4.6 to 9.0 (this is equal to an increase in air velocity from 21 feet per minute to 252 feet), and the wet "kata" power increased from 13.4 to 25.9. Tested with the wet bulb, the air showed a temperature of 68.5 degrees, which was certainly reasonable. Its cooling power would have been well above the recognized standard even if it had been considerably hotter.

Another side of this question is the effect of high temperatures on the frequency of accidents. No separate figures are available for the textile industry, but taking an average of the more than 100,000 industrial accidents officially notified every year in Britain, it is found that 67 degrees is the figure at which fewest accidents occur. At a temperature of 77 degrees 23 per cent more accidents occurred than at 67 degrees, which seems to demonstrate that a high temperature leads to carelessness and inattention on the part of workers, with its natural corollary—an increased liability to accidents.

There is no doubt that high temperatures in weaving sheds have a considerable effect on the health of the workers and tend to increase both the sickness and mortality rates. There are two causes for this, one being that heavy work at high temperatures causes excessive fatigue, while the other is that the workers are liable to get overheated, which condition is likely to result in their catching a chill or getting rheumatism from sitting about in clothes which are damp. According to returns issued by the British Registrar-General covering a period of 12 years, the healthiest occupations for those engaged in industry are, first, that of agriculture, and, second, work on the railways. The relative mortality in these two classes was only about three-fifths of that of the general population, largely because there were few deaths from phthisis and respiratory diseases. In the textile industry the mortality showed considerably above the average, though it is not so bad as in certain other industries, such as the pottery and the cutlery, for instance.

The influence of atmospheric conditions on the efficiency of the workers in the textile industry is one worthy of study, though it must be admitted that not a great deal has been done in this direction up till now. These conditions have a considerable effect on the health and efficiency of the workers engaged in the industry and the evolution of something approaching a science from the collection of data, a science which would serve to govern conditions in textile factories, would be of the greatest benefit to all parties concerned. The manufacturers would benefit from the increased output which always results from a physical and psychological improvement, in the conditions under which the work is carried out, and the workers would be healthier and more contented.

A Permanent Cushion Top Roll.

The accompanying illustration shows a new top roll for which a patent has recently been granted Leon W. Campbell. The main advantage claimed for this new roll is that it will produce an absolutely uniform cushion on every roll, which is a feature that will be readily recognized by the practical superintendent and spinner as assisting in improving the quality of the spinning as each roll will draft equally.

In the use of this roll, it is pointed out, lap-ups will not hollow the roll in any way. The use of roller covering is entirely eliminated on the middle and back rolls of the spinning frame, for example, and while this new roll is

also used as a front roll, only a sheepskin covering is used on the front; and, because of this point, it is claimed that the cost of covering necessary is reduced by one-half.

This roll is constructed with a spring steel bushing forced on a cast iron core, and, as will be noted from the illustration, the surface of the bushing is divided into ribs which produce the proper cushion. Tests were made to determine the best thickness of steel to use in order to secure the correct cushion for this purpose.

These new rolls are readily interchangeable with the rolls in present use, and may be used together with the old rolls until the change-over has been completed. The roll can be applied not only to the spinning frame, but also to other drafting machines in the mill using three drawing rollers.

The following colors have been recommended by a committee of the American Society of Mechanical Engineers for identifying pipe lines: Live steam, white; exhaust steam, buff; low pressure water, blue; boiler feed water, blue and white; salt water, green; air, gray; lighting gas, aluminum; gas engine pipes, black, red flanges; fuel oil, black; refrigerating pipes, gray; refrigerating flanges and fittings, white and green stripe.

It is stated that applying these colors only to the fittings, valves and flanges is sufficient, while the piping may be painted any desired color to reflect light or harmonize with the surroundings.

An excellent perpetual appraisal record consists of one card, or loose leaf sheet for each machine. These can be grouped into departments. On the card is recorded the first cost, the freight, the cost of installing, the cost of major repairs, the depreciation rate and amount, and the present value. If the machine is moved to another department, that fact is noted on the card, and the card is transferred in the file to the new department.

Popular Textile Chemistry

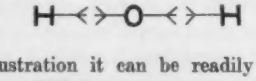
BY JAMES A. BRANEGAN.

PRESIDENT, KALI MANUFACTURING CO., PHILADELPHIA.

Water.

Although many people consider water an element it is in reality a compound. An element is something that cannot be divided and water can readily be divided into hydrogen and oxygen. The decomposition of the compound water into the elements hydrogen and oxygen is effected by means of the electric current. If the terminals of an electric battery are tipped with platinum and dipped into water, which has been acidulated by adding a small amount of sulphuric acid, it will be noticed that a gas bubbles up from each terminal. Now if we place over each of these terminals inverted glass tubes filled with water, and so arranged that the gas from each terminal will displace the water, we will find in one tube oxygen and in the other hydrogen. This action is known as the "electrolysis" of water. We will also find that the volume of hydrogen is exactly twice the volume of oxygen and hence the expression, "H_2O," with which every school boy is now familiar. If water was correctly named, by the universal descriptive method of naming new compounds which is now in use, it would be called "Dihydrogenoxide."

From the above you will note the formula "H_2O" means two volumes of hydrogen and one volume of oxygen. In chemistry we never put down the unit "one" after a symbol, which is the reason there is no figure after the oxygen. In other words, when there is no figure after a symbol in chemistry it signifies one volume of that element. By weight the proportions of hydrogen and oxygen in water are very much different than the volumetric proportion shown above. The element oxygen is sixteen times as heavy as hydrogen, and, therefore, an atom of oxygen is sixteen times as heavy as an atom of hydrogen. Now in the compound H_2O (water) we have two atoms of hydrogen to every one atom of oxygen, and if an atom of oxygen is sixteen times as heavy as an atom of hydrogen, it naturally follows that this same atom of oxygen is eight times as heavy as two atoms of hydrogen. Therefore the proportion of elements in water is eight oxygen to one hydrogen by weight, while by volume the proportion is two hydrogen to one oxygen. The fact that this combination of two atoms of hydrogen and one of oxygen in water never varies can be readily understood if we imagine all atoms to be live microbes, all of the same size (or volume) but each kind of atom having a different number of arms, each with a hand at the end. Then let us imagine the hydrogen atom having one arm with one hand and the oxygen atom having two arms with two hands. In chemistry these arms are called bonds and no compound can exist unless the bond, or hand, of one atom grasps the hand of another atom, there can be no free hands (bonds). In the water molecule each of the oxygen hands grasps a hand of hydrogen and there are no free hands, thus:



From this illustration it can be readily understood why water is always "H_2O."

These gases which form water are, in their chemical behavior, very much different than water itself. We all know that water will extinguish fire, while hydrogen in the presence of air is a great explosive gas, and without oxygen nothing will burn. The explosion of hydrogen in air is in reality the formation of water (H_2O) by the oxygen in the air combining with the hydrogen. All fire is simply some element, usually carbon, combining with oxygen. Therefore, in water we have a compound of two gases which will extinguish all combustion and yet when these two gases are separated we find one, hydrogen, is very explosive and the other, oxygen, is the element which promotes all combustion or fire.

In the textile arts water plays an important part and principally in the dyehouse. If much lime or magnesium is present it will combine with the soaps and oils which are used for scouring and wetting out, and form insoluble lime and magnesium soaps which float on the top or adhere to the fiber. As the lime and magnesium soaps take the dye in different proportions to the fiber itself there is uneven dyeing. In the dyehouse these insoluble soaps, formed from hard water in combinations with soaps and oils, are usually referred to as "doughballs." These doughballs are sometimes removed by acetic acid, but the results are not always satisfactory, the more satisfactory method being to soften the water itself. Completely sulphonated oils have less tendency to form precipitates with hard water and are much used for wetting out and dyeing. These completely sulphonated oils, when made from castor oil, are known in chemistry as "Hydroxyoleinsulphonic Acids," but commercially the name is shortened.

If the water used for textile purposes contains much iron it injures the dyes and causes spots and is very harmful in bleaching and in turkey red dyeing. Sulphuric acid, if present, also at times causes trouble. Ammonia and nitrites, while harmful in water used for domestic purposes, are of little importance in textile work.

Various substances and methods are used for softening water and where the lime and magnesium are not in great excess, good results are obtained by oils as mentioned above, or chemicals such as soda ash, tri sodium phosphate, borax, boil salts and ammonia.

When the water is particularly hard it should be treated before using. One method is based on the fact that the lime and magnesium in the water are kept in solution by the free carbonic acid present in the water. Sufficient lime is added to convert this free carbonic acid into carbonate of lime and then soda ash is added to precipitate the original lime present in the water and also the lime added to "kill" the free carbonic acid. The precipitated lime is then filtered off or allowed to settle. If the free carbonic acid was not "killed" by converting it with lime, there would be no precipitation when the soda ash is added. This method gives good results but must be handled very carefully and accurately.

Another method, which does not need any technical ability in handling, is by the use of zeolites. Zeolites are a group of minerals which consist of silica and aluminum, with alkalies and alkaline earth. These zeolites have the

peculiar property of instantly replacing their soda contents with lime in solution, so that when water is passed over zeolites they hold the lime and magnesium and sometimes the iron. When the zeolites are exhausted their active properties can be renewed by washing with common salt (Sodium Chloride). Zeolites are now made synthetically and these artificial zeolites have even greater efficiency than the natural minerals, as the manufacturers endeavor to leave out any inert material.

Alum filters are sometimes used, particularly when the water is muddy and contains organic matter. This organic matter is coagulated by the alum or sulphate of alumina which renders filtering easy. This method, however, is used mostly for domestic purposes although some dyehouses have found it necessary. Care must be exercised in adding sulphate of alumina to water for textile purposes as any excess will increase the permanent hardness.

Rain water is the softest of the natural waters and, therefore, surface water is best adapted for dyeing. In Switzerland the dyehouses use the water from mountain streams which is practically pure as it is melted snow. River waters vary in their hardness and two rivers in the same locality may show a big difference in hardness, for instance, in Pennsylvania, the Delaware River water is fairly soft, while the water of the Schuylkill River, a tributary of the Delaware, is extremely hard. Artesian well water is generally hard, as it usually passes through limestone rock and this limestone is gradually dissolved by the water and forms a permanent hardness. Magnesium is usually present in limestone and this also adds to the hardness. There are exceptions to this rule and wells have been sunk which gave fairly soft water. This usually happens when only sandstone is met, which does not affect the water; in fact, sand acts as a filter and helps to purify turbid water.

The softest water and one best adapted for textile purposes, which the writer ever analyzed, came from the New Jersey coast just back far enough from the ocean to escape the salt contamination and as there was nothing but sandy soil, the water was practically pure.

The most important test of water for textile purposes is the soap solution test for hardness. Every dyer knows that the greater the amount of permanent hardness (lime and magnesium) a water contains, the more soap it takes to form a lather, as pure water will form suds with a minimum amount of soap. All this soap which is used up before a sud is formed is wasted. The amount of soap so wasted has a direct ratio to the hardness present and this fact is the basis of the test which is known as "Clarke's soap test for hard water." In making this test a standard hard water is prepared by adding sufficient barium or lime to one gallon of distilled water, so that the finished solution contains the equivalent of one grain of calcium carbonate (Carbonate of Lime) to the gallon. There is then prepared the soap testing solution which is made by dissolving a small amount of castile soap in a one liter mixture of grain alcohol and water. Next a measured volume of the standard hard water is taken in a glass stoppered bottle or cylinder and a few drops of the soap solution are added from a burrette (a graduated glass tube). The bottle is well shaken after each addition and the addition of soap solution continued until a permanent sud that will stand one minute is obtained. The amount of soap solution used is carefully noted and used as a basis in testing in the dyehouse waters. For example, if in testing the prepared standard hard water, it takes one cubic centimeter (about a thimbleful) of the soap solution we know that the quantity of soap solution means one grain of hardness to the gallon. Therefore if in testing the same measured volume of well or river water, we find it takes six cubic centimeters to form a sud, then we know the hardness equals 6×1 or six grains to the gallon. A good water will run three to five grains to the gallon and a fair water will show from six to eight grains, while a very bad water will run as high as eighteen to twenty grains per gallon.

During a spell of dryness the water from wells and rivers becomes more hard, owing to the fact it has been longer in contact with the various minerals and also on account of evaporation which tends to concentrate the impurities. Rain water is pure and contains no hardness of any kind and, therefore, during periods of heavy rain we have soft water. For these reasons the dyehouse water should be tested at frequent intervals.

Water used for bleaching need not necessarily be soft, particularly if chloride of lime is used, as chloride of lime will, of course, make any water hard. Iron, however, should not be present in bleaching as it causes spots and will make the goods yellow. The presence of iron in water is easily determined by adding a few drops of yellow prussiate of potash to the water contained in a test tube or bottle and shaking, if iron is present the water will turn blue. If a spot is to be treated, a drop of the prussiate solution on the end of a glass rod touched to the stain will turn blue if iron is present. Other impurities in water for textile purposes, such as sulphates, chlorides, silica and aluminum, etc., are of minor importance and usually disregarded.

Pure water freezes at 32 degrees Fahrenheit (0 degrees Centigrade) and boils at 212 degrees Fahrenheit (100 degrees Centigrade) and is the least compressible of all substances. The weight of water is called the unit of specific gravity or one, and the weight of all other substances, either lighter or heavier, are reckoned from this unit. For instance, if a liquid is twice as heavy as water its S. G. (Specific Gravity) is "2," while if it is only half as heavy as water its S. G. is "0.5." Pure water is neutral to all reagents. A gallon of water equals 231 cubic inches and weighs 8.33 pounds, while a cubic foot of water weighs 62.37 pounds. Water is the base of the metric system for weights and measures and one cubic centimeter of water weighs one gram, while 1,000 cubic centimeters equal 1 liter and weigh 1 kilogram or 1,000 grams. Pure water is odorless and tasteless.

Announcement is made by Logemann Brothers Co., manufacturers of the well-known "Logemann" baling and scrap metal presses, that they have purchased the business, patents and good-will of the Chicago Baling Press Mfg. Co. of Chicago, and in addition to their regular line of hand-operated, power-driven and hydraulic balers, are now prepared to furnish the "Logemann Modern Leader" balers and repair parts formerly manufactured by the latter organization.

The business is now entirely conducted from the main offices and works of Logemann Brothers Co., at Milwaukee, Wisconsin, and through their district offices.

Doff and Pte.

The Fifth Modern Fable

NOT BY AESOP.

A few years back, just beyond the edge of the beginning of things, when nature was in process of formation and the manufacture of cotton was, so to speak, in the embryonic stage, the scenery around our front yards—so historians say—was somewhat different.

Along the banks of the Yadkin, Catawba or maybe Coosa, where now the heavy headed, trembling Bluemonday hopelessly stalks the trail of the fierce and florid Weekend-hangover—commonly called "Bun"—and the Punctual Pay-day calls fiercely across the empty hours to the Lambent Lazzarone, there dwelt in those days a quadrumanous family who infested the upper circles of society under the name of Smiidae.

They didn't exactly have that name in the telephone directory at the time, nor on the front door by the bell, and if you had stood under their flat and called up to the extent of your breath you would have had no answer save the strident laugh of a passing jackass or the hungry glare of a lurking tiger, for it was not until a myriad of spindles began to squeak their circular way for the adornment of the human form ridiculous that learned men, looking back a-down the years, bestowed upon the time hallowed personalities of this family the hardest names they could think up as a token of their respect.

Not that there was any respect paid them in their own day, for they were the weakest, albeit the most important, members of society and—as it still transpires to this time—they dared not descend from their high position for fear of being devoured by the lower members thereof. They didn't know, either, that they were the original of a certain type of family which has endured and become numerous in that same neck of the woods. They were too busy maintaining their high social position—too high for the tigers.

Old man Sim himself rarely left the arboreal flat. He hung around—literally—while mother Sim did the family wash, when there was any, and chewed up the peanuts for the baby. He really didn't have time for anything else, what with listening to mother Sim's gossip with the neighbors and keeping track of the nuts and berries the children brought in. He always bragged that his family, though large, was well brought up and the best nut gatherers in the neighborhood, especially Doff. Doff was the smartest, quickest boy he ever had and could bring in more nuts than any two other young monkeys. In fact, he was so famous that he gave his name to his own particular line of work so that when any of the others made an especially good haul his companions would cry as encouragement, "Attamonk, that's doffing 'em!" an expression which, as you will agree, has endured to this day.

Doff had the strongest feet, the most expert tail, the fastest hands, so that in time he came to be the boss of all the rest; but he had one fault—his mind seemed to wander at times. There would come moments when his hands would slacken, his feet loosen, his tail unwind and he would stand, perilously near falling while the tiger, that always lurked hungrily below, would edge up a little closer and open his slavering jaws a little wider. And once he fell and the tiger almost got him.

The truth was that Doff was dreaming. First forerunner of countless little boys and girls who have since sat—when they should have been busy—with idle hands and empty heads and dreamed of love and truth and beauty, dreams which they have sometimes lived to see come true of the development and progress and betterment of the world. Doff was dreaming, not of the neighborhood flappers, as you might suppose, but—silly monk—of learning to fly. Being the best of his kind, he now wanted to be something else—something nature never intended him to be.

He wanted to fly. At the top of his family tree there dwelt a frisky little something that was neither a bird nor a lizard but a sort of cross between, a something which men have since named Pterodactyl and which, in spite of the handicap of such an appellation, could sail through the air after a fashion. Every morning before he started to work Doff watched Pte throw himself recklessly out into air and sail off in search of his provender. And Doff wanted to do that too. He was tired of having to swing along from one tree to another through the leaves and along the branches. He wanted to let go and glide through the air like Pte did. He was the best nut gatherer of his tribe and boss of them all, but he wasn't satisfied. He wanted to be something else.

So one day when ma Sim rang the dinner bell and Doff started across the grapevine bridge to go home he noticed Pte doing some extra fancy stunts right overhead, and the more he looked the more he became convinced that he could do as well, and when he was halfway across the bridge he gave first one little jump and then a bigger one until about the time he was persuaded that he really would fly if he jumped off the grapevine altogether, he slipped on a grapeskin and—well, Doff didn't get any dinner, but the tiger did.

Foolish of him, you say, but let us examine ourselves before we pass too harshly on poor little Doff, for while the tiger got him, the rest of the family lived to a ripe old age and raised a few children along the way, and we may be some of their descendants. I wonder if we ever stop in the midst of our work and let our minds wander off? I wonder!

"But," I hear you say, "the progress of the world is built on such dreams. Doff had reached the limit of his present position and was looking for something better. Can you blame him for that? He was tired of being a monkey doffer and wanted to leap boldly from the towering tree and blithely sail the azure blue. If you discourage such things, what will we come to? Where would you spend your evenings if Edison had not dreamed of electric lights and moving pictures? What would you do for somebody to swear at who couldn't jump right on you if Bell had not dreamed of the telephone? And how would you get down here and back every day if Henry Ford had not dreamed he smelled auto smoke?"

All very true. The sum of human progress is to be

found in day dreams, but also, it seems to me, the sum of human futility. If we could only keep our minds on it all the time! But we can't, and the tiger gets us. Our English cousins have a saying which must be pronounced as near like this as you can get it: "It's not the 'unting with the 'ounds as 'urts the 'orses 'oofs, but the 'ammer, 'ammer, 'ammer on the 'ard 'ighway," and which holds beneath the surface much more than a humorous imitation of the Cockney accent.

Its not the hunting with the hounds that hurts the horse's hoofs. As long as the chase is on and excitement fills the air; the horses can easily gallop over freshly-plowed ground, jump walls and ditches and carry on without rest or weariness until the run is over and the chase is done. But when he is put to the drudgery of hauling a cart, the prosaic hammer, hammer, hammer on the hard highway quickly wearies him. The sun grows hot, the dust of the road fills his nostrils and his feet hurt.

And so it is with us. It is not the hard work that gets us, but the monotony of trying every minute in every day to do our full duty to the company. How many of us conscientiously do? And then comes somebody by with a joke, an invitation to the soft drink stand, a newspaper, and off we go full cry with the chase, leaving our cart deserted in the road. And yet, some time, sooner or later, when we come back and find another horse hitched up in our place, we feel resentful and think we have been harshly treated.

After a long, long time, Doff came back, the brightest, smartest, quickest boy his daddy had. He kept the old man with change in his pockets and chewing tobacco in his face. He started as a doffer and worked by steps and changes to section man, second hand, overseer and superintendent. He almost slipped when he found a little red-headed girl working in the spool room, but he married her and got over that. Then, when he was general superintendent of a large system of mills, he sort of loosened his grip and began to look around, and somewhere along the grape vine bridge that leads from obscurity and failure to success he stepped on a grape skin. I forget just what kind of a grape it was, draft, twist, production, or whatever. It would not have mattered if Doff had kept his grip, because he had met with lots of them before, but this time he had his head in the air and his mind elsewhere, and the boss said, "Well, Doff, old man, we're sorry, but"—

I guess you know the rest of it. I don't know what he was thinking of. I know one good man who tried to run a picture show and forgot the mill entirely. Another got bit by the Golf Bug. Another had a farm. The result was the same in all cases.

So if you're an Edison or a Bell or a Ford, go ahead and dream yourself crosseyed. What money you get out of it I won't begrudge you, because I know I will be benefited by it too, somehow, but if you are just a plain cotton mill monkey like I think you are—and I know I am—you had better confine your dreams to the time after supper when the family is safely parked at the pictures. Then, if you have no babies to mind, dishes to wash or socks to mend, you can elevate your heels to the level of your head so some blood can run to your brain and dream to your heart's content until the wife gets back and kicks your shoes under the bed and you into it. Otherwise, if you slip like Doff did, don't say I didn't tell you.

Now you take me: I always attend to business during business hours. I wouldn't think of doing otherwise, and if I had I would never have worked up to this job. I always keep my mind right on my work and—

The boss just now threw my desk and chair out of the window and says if I don't attend to business, he'll find out why, so I'll have to tell you more about it later.

Processes of Finishing Cotton Ducks

BY WILLIAM B. NANSON.

Khaki.

The first operation in the dyeing of khaki (cotton) is the scouring which must be thorough, so that no motes or specks are left in the goods, this process has been thoroughly discussed in a previous section and we refer the reader to it. It is also essential, in the case of army drills for uniforms, that the goods be well singed on the face before scouring—ducks do not require this. It is also necessary that the goods, after being scoured and dried, should be in an absorbent condition, as these goods are usually very tightly woven and difficult to penetrate as they are run dry into the dye liquor. To carry out this requirement it is a good idea to treat the goods, after scouring, with some good capillarist to induce absorption. Castor oil soap or soluble castor oil is the best thing that can be used for this purpose, therefore, the process thus far will include first, singeing if the goods be drills; second-scouring, which operation should include a final run in castor oil soap (Monopole soap or oil), using about four ounces of soap or oil to the gallon—don't wash from this. The goods are now carefully dried up on the dry cans. It is of the highest importance that the goods should be thoroughly and evenly dried, for if any thick threads or knots are left wet, or any parts of the fabric are the least bit damp when they go to the subsequent padding operation, these places will dye up of a lighter shade. For this reason it is also advisable to lay out all seams as the goods come off the drier, because these thick seams may be wet and mark off wet places to the body of the cloth if left inside the batch. We are, of course, assuming that the goods are plaited down into a truck as they come off the drying machine—one bale of 1,000 to 1,500 yards on each truck, and that each bale will be kept intact throughout all subsequent operations.

The scoured and dried goods are now passed through a mixture of ferrous and chromic acetates. The former may be the regular black iron liquor of commerce, or, what is better, it may be made in the dyehouse by the double decomposition of copperas and acetate of lime and the latter may be made in the same way by the double decomposition of chrome alum and acetate of lime. This mixture used in about equal proportions of iron and chrome salts should be used cold at a strength of about 16 degrees Tw.

It is the best to run these goods in the chrome and iron on a similar machine to the one described for dyeing catechu browns (see Fig. 1 in the previous section); keep the liquor cold and allow the goods after the first run to lie overnight. Care must be taken to run the goods evenly on the selvages

or any projecting fold will age up and finish darker than the rest of the cloth. It will be also necessary to have the night watchman turn the rolls occasionally during the night to prevent the liquor from settling all to the lower side.

It may be as well to say here that the goods are laid overnight to permit the thorough penetration of the liquor. Unless the goods are allowed to steep some time in the liquor they will be white and undyed inside. After lying overnight the goods are run again in the same liquor at 16 degrees Tw. and then heavily mangled. The mangle may be geared to a set of drying cans and an ager all geared to run at the same surface speed. The first four to six cans must be lapped with thin cotton cloth to prevent the iron and chrome liquor from being burned on the cans and marking off on the goods. This will also happen if the goods are put on the cans too wet. It is important that this lapping be kept smooth and that there are no dirty spots, or pin holes in the cans to leak steam or water on the goods.

It must be always impressed on the mind of the dyer that every mark made on the goods at this stage will make itself manifest a hundred fold on the finished goods—there must be no wrinkles, no spots, light or dark, no finger marks, etc. Care must be taken that the goods are thoroughly dry as they come off the dyer and before going through the ager. The ager should be kept at a constant temperature of 220 degrees F. It is also essential that the goods be kept free of wrinkles and creases while passing through the ager.

I might say here that good work can also be secured by running the goods in the chrome and iron on a single box dyeing machine or padder and winding on to rolls at the back as described for wetting out the goods for catechu brown, but I prefer the machine just described.

After the goods are dry and somewhat cooled off comes the so-called developing bath, wherein the hydrates of the chrome and iron are preciptated upon the fiber as oxides, and which is made up of a solution of soda ash 58 per cent and soap. By oxidation the hydrates of these metals are transformed into their corresponding oxides.

Abroad, caustic soda is used, but the writer has never gotten as good results as by using soda ash 58 per cent. The soap used is of the chip variety though any good soap will answer. This soap is used partly as a softener but principally to cause a further fullness and mellowness of the shade, and to increase the water repellency of the cloth.

The machine most commonly employed, and which is run continuously all day, is a six-box open soaper. This is a well known and commercially manufactured machine and, therefore, needs no illustration. Each box is piped for steam and is also fitted with a pair of heavy squeeze rollers which may be rubber and brass or both rubber. Into the *fifth* box is piped the alkali soap liquor which is made to run continuously by gravity from a stock tank above it. The partitions between the first five boxes are so perforated that the fifth box really acts as a feeder for the other four. The first box has an outlet, and thus takes care of any overflow, while the sixth one contains only water at about 120 degrees F. and more often running cold water, for the goods must be washed well.

The idea is this: the goods enter the machine at the first box and through the dirtiest liquor, the second, third and fourth are each still cleaner and the goods get their final run in the freshest and cleanest liquor which is in the fifth box, finally the sixth box washes them. The liquor is all fed into the fifth box and runs through the other four to the outlet. A medium excess of alkali should always be present in the first box, otherwise the metallic hydrates or oxides will be only partially fixed and the finished color will rub badly and will not stand the abrasion test, moreover the goods will not be dyed through and have a harsh feel. On the other hand, an excess of soap produces a dull, heavy and cloudy shade. The first five boxes of this machine should always be kept at a boil; otherwise the resultant tone will be cloudy and shady and raw looking and have a very muddy appearance.

In this bath a double decomposition is taking place, leaving therein the sulphates, acetates, and chlorides of soda which tend to greatly increase the density of the liquor. Hence, it is absolutely impossible to determine the alkalinity of the liquor by the hydrometer and, therefore, some system of alkalimetry must be adopted to test it, so as to keep it strongly alkaline.

For very ordinary purposes the goods might now be dried up directly and finished. However, to further clear up the shade, render the material more water repellent and overcome a certain redness and dullness, which invariably follows the alkaline bath, and also to increase the fastness to perspiration and acids, the goods are given a treatment in a bath containing silicate of soda and soap. This is best done by the use of a four-box machine, running the goods once through continuously. The first two boxes contain the silicate and soap solution—one pound of silicate, and one-half pound of soap to the gallon at 160 to 180 degrees F., freshen up with a dipper of this solution at each box on each passing seam. The last two boxes contain running water. The goods are now dried and finished as usual.

The foregoing process is eminently adapted for the dyeing of cotton ducks, and the usual drills found in the trade. However, army uniform cloth would neither be of the requisite fastness to organic or mineral acids nor would it possess quite the desired water repellency. Therefore, cloth of this character, after coming from the developing bath, is jigged in a solution of silicate and soap, nine or ten ends at a gentle boil, or they may be run twice through the silicate and soap on a three- or four-box machine with all boxes gently boiling.

They are then run through acetate of alumina at 6 degrees Tw., washed, mangled heavily and dried up. The finished cloth should now possess a moderately soft handle and for all purposes is absolutely fast and water repellent.

Perhaps we ought to impress it upon the dyer that the goods after mordanting with the chrome and iron must be heavily mangled before drying, a mangle working under a hydraulic pressure of 750 to 1,050 pounds pressure is preferred.

This heavy pressure is necessary for three reasons: first, if the cloth is not entirely freed from all superfluous moisture it will "mark off" in the subsequent drying and become blotchy and stained by contact with the drying cylinders. To avoid this it is customary to wrap the first four dry cans with light cotton sheeting, but this sometimes fails to avoid the difficulty and the cloth quickly becomes soiled and worse than useless unless the goods are thoroughly squeezed. Second, a heavy pressure is necessary to drive the mordanting liquor into the pores or interstices of the fibers to assist the penetration and dye the

goods through. Third, cotton has the power inherent within itself to withdraw the metallic oxides from their solutions, especially their neutral solutions, and under a great pressure, it has the added power (which is but imperfectly understood) of overcoming to a degree chemical affinity, and causing the disassociation of the acids and their mineral base and depositing the metallic oxide on the cloth.

I might say that many dyers in Europe do not age these goods at all, but I prefer to age them as described. In this, however, I have not practiced as I preach, for I have dyed many million yards of khaki and never aged a yard of them, having had no ageing machine, but I am convinced of its value in making faster and cleaner colors and have no hesitancy in strongly advocating its use.

Khaki includes a whole range of shades on cotton fabrics. These shades possess extreme fastness to light, hydrogen peroxide, boiling soap solutions, alkalis and acids, abrasion, perspiration, and, moreover, they must be water repellent, and the tests for all of these requirements as per U. S. A. specifications are very exacting and severe.

Some of the vat dyes may be used in part to produce certain tints or effects either alone or in combination with the metallic oxides, but their use is limited and the ultimate results have often proved unsatisfactory. The indanthrenes and allied substances have the required fastness but they cannot be combined to produce the full range of shades demanded, neither could they withstand many of the tests required by a Government inspector.

Even the inorganic coloring matters such as the oxides of the metals, as usually applied, are far from being entirely satisfactory because it is necessary to form them upon the fiber, and to do this properly is a very difficult and troublesome operation, except in the case of very light shades and open fabrics.

There are many different methods used for dyeing khaki but the one which I have given in detail is the only one that may be called entirely satisfactory. For instance, the writer has dyed a great many thousand yards of goods for the U. S. A. uniforms without either scouring the cloth preparatory to dyeing or ageing the cloth after padding. We handled the goods something like this:

The goods in the grey, direct from the bale, were padded on a single box dyeing machine in a solution of—

12 ounces sulphur brown (Geigy) B. H.
8 ounces sulphur olive
1½ pails Turkey red oil
1½ pails caustic soda solution
40 gallons water.

Run boiling, twice through, and thoroughly dry on cans.

The caustic soda solution is made from 80 pounds dry caustic and 40 gallons of water. After drying run the goods twice in chrome and iron, cold at 16 degrees Tw. The chrome tub is made from 150 pounds of chrome alum, and 50 pounds acetate of lime, 40 gallons of water, settle and use only the clear. The dyebath is made up with 6½ pails (78 quarts) chrome liquor from stock tub; 3½ pails pyroligneate of iron (commercial) at 12 degrees Tw., and make this up with water to 40 gallons.

After heavy mangling and careful drying the goods are raised in boiling soda and soap as before, washed and soaped, and then run through acetate of alumina cold at 6 or 7 degrees Tw., and, without washing, mangle heavily and dry up. This is, of course, a much quicker and cheaper way of doing khaki than the previous one, but, while the writer got away with it and it passed okeh for all tent and legging goods and some uniform goods, I would not recommend the reader to use it for U. S. A. uniforms, though it seemed good enough for most requirements of private parties as it fulfills all government tests, but may not stand the wear and tear of time.

After innumerable experiments it was found that silicate of soda possessed the peculiar property of rendering the goods not only acid proof but pliable and more water repellent. Why silicate of soda should have this effect is a mystery to the writer but it surely does this.

The goods should be run twice, at least, on a single box machine at a full boil, using about ten quarts of silicate of soda at 40 degrees Baume to ten gallons of water. These quantities are not arbitrary; each dyer works under different conditions and must make his own experiments until he gets the desired result, and then stick to it.

Chrome Yellow and Orange.

A great many ducks and drills are dyed chrome yellow and orange for the awning and advertising umbrella trade. This orange must be fast to sunlight and weather—it must neither fade nor bleed if exposed to the sunshine and rain, and a chrome orange is the only orange color that will fill the bill. No aniline has yet been discovered that will fill the place of chrome yellow or chrome orange where brilliancy of color and fastness to sunlight are necessary essentials.

To dye these colors on cotton piece goods several separate processes are necessary. Chrome orange is obtained by fixing upon the cloth the subchromate of lead, and this may be effected by subjecting the goods to the following three processes:

First: The impregnation of the goods with a basic salt of lead and the precipitation of the insoluble oxide on and in the goods; second, the conversion of the precipitated oxide into the neutral chromate or chrome yellow; third, the conversion of the chrome yellow into the subchromate or chrome orange.

To carry out the first of these operations we may proceed as follows: The goods are first thoroughly scoured as described when dyeing khaki. The goods are then padded in a cold solution of sulphate of magnesia (Epsom salts) at 8 to 10 degrees Tw., and then dried on the cylinders. They are next padded in a cold solution of tribasic acetate of lead at 7 to 10 degrees Tw., and steamed two or three minutes on the rapid ager in an atmosphere of steam and ammonia gas and dried again. The chemical reactions that have taken place during the above operation are as follows: The sulphate of magnesia and the basic acetate of lead have mutually decomposed each other into sulphate of lead, which becomes indissolubly combined with the cloth, and acetate of magnesia which remains in the liquor with the lead acetate, and any undecomposed lead acetate that may be carried forward by the cloth is converted into an insoluble sub-oxide by the ammonia gas in the steam box.

It may be as well to explain at this point what is meant by a basic salt of lead, and how to prepare it for use in the dyehouse. The tribasic acetate of lead is a combination of three equivalents of oxide of lead and one of acid and is made by boiling six parts of acetate of lead with eight parts of litharge, or lead protoxide, until the litharge is dissolved.

The next operation is the conversion of the oxide of lead into the neutral chromate or chrome yellow. To effect this the cloth must be passed through a cold solution of bichromate of soda or potash, containing five pounds of the bichromate and one quart of sulphuric acid to fifty gallons of water. This should completely convert the oxide into the chromate and dye the goods a deep, rich lemon yellow.

It is of the first importance, if the goods are for orange, that they should be thoroughly washed after this last operation. The chrome yellow being only a pigment of color, is combined with the goods only in a mechanical way and therefore contains many loose particles that are uncombined with the cloth, and unless these are completely removed by washing, the resulting orange color will be dusty and probably cloudy.

We now come to the third and last operation of converting the chrome yellow into the chrome orange. This consists of running the goods through a single box dyeing machine in a bath of a boiling saturated solution of newly slacked lime or milk of lime.

The developing of the color or "raising," as it is called, is the "crux" of the whole process. If the lead has been improperly prepared, or it has been imperfectly fixed on the goods, the lime will strip the color off, leaving but a red salmon shade; or, if the goods are unequally dyed, the color will come off in parts, and what is more frequently the case, the chromate of lead being entirely soluble in lime water at a temperature a little below boiling, if the lime bath becomes a little too cool the color will be stripped instead of raised.

The lime bath must, therefore, be kept at the "spring of the boil" to raise the orange and any lower temperature will spoil it.

After raising the goods must be thoroughly washed as quickly as possible, for, if allowed to lie in contact with the lime liquor for any length of time, the lime will strip the color and spoil its brilliancy.

Goods that are intended for umbrellas, awnings or advertising signs or for decorative purposes, must not only be fast to sunlight but they must be clean and free from all loose particles of color so that they will not bleed or "run" when rained on. Now chrome orange, being a loose pigment only, is very liable to run and, therefore, it is essential that the goods should be thoroughly cleansed and freed from all loosely adhering particles of color. The goods, therefore, after raising must be washed well in hot water, then soaped in hot water, soda ash, and oil, or monopole oil or soap, and dried as hot as possible without washing.

It may be as well to say that if the goods are to be finished up and marketed as chrome yellow they must be fully bleached before dyeing or the color will not be clear and bright, but if the goods are for orange the scouring process as described for khaki is sufficient.

Bleaching Duck.

When bleaching cotton goods we have two factors to consider: the composition and method of removal of the coloring and foreign matters inherent to the cotton fibers themselves, and the matters which have been added during the process of manufacture such as dirt, oil, size, etc., the former amounting to about five per cent and the latter to about 10 per cent for the warp only, or a total loss in weight of about ten or fifteen per cent.

With regard to the first of these, while their decomposition has not been very accurately ascertained, it is known that their properties are neutral and that they are composed of carbon and hydrogen with oxygen, and a certain portion of them are made soluble and can be decomposed by alkalis and boiling water and by the aid of diastase and can, therefore, be removed by steeping and boiling.

When bleaching cotton duck we must bear continually in our minds the following requirements: A clear white, a full and lofty feel, similar to the same goods unbleached, a retention, as far as possible, of the original weight and tensile strength, and a soft, natural, spongy and elastic finish capable of absorbing size in large quantities without making a too brittle or wiry fabric if heavily starched, or, a sleazy, thin feel if finished pure; the threads must stand up, round and full, and the goods must be free from all specks.

Owing to the peculiar close construction of cotton ducks which causes them to break in ineradicable wrinkles or creases if doubled under pressure in the washing machines and squeezers it is absolutely necessary that these goods be kept smoothly extended to full width during all the operations of bleaching or finishing. This can be done by carrying out all the operations on one-, two-, three- or four-box machines and wide topped kiers as described under the head of scouring. Always remember that the goods *must always* be wound upon rolls at both the water and starch mangle—a whole truckful (1,000 to 1,500 yards) on each roll—no goods must be run from *trucks* over the cans.

If the goods are for ordinary use such as jackets, blouses, overalls, clothing, etc., they must be thoroughly scoured by one or the other of the processes given under the heading of "Scouring" and then, after the last washing, they must be run through a solution of chloride of lime standing at 1 degree Tw. and allowed to lie on the trucks (or in a pile) for about four hours. They shou'd then be washed and soured and let lie in the sour two hours. Wash well and mangle in hot water containing acetate of soda or ammonia to neutralize any free acid that might lurk in the goods, for it is almost a practical impossibility to *wash* all the acid out of duck.

Where small lots of duck are bleached and it is not convenient to fit up with the various one-, two-, three- or four-box machines, two or three small machines like Fig. 1 in Part 2 can be installed and the work carried on as follows: Always supposing that one whole bale (1,000 to 1,500 yards) is wound on each roll, and the whole process conducted on rolls. The goods should first be thoroughly wet out in hot and then in cold water, keeping them on rolls all the time, i. e., run from one roll to another. They should then be run in water at about 80 degrees F. to which has been added two to four pounds of diastafor to every 100 gallons. This must be constantly freshened up with fresh liquor to keep the strength up. The goods must lie in this for several hours or overnight. They must then be run through a hot solution of caustic soda at 3 degrees Tw., soda ash and *castor oil* soap, the percentage of each must be 50 caustic soda, 40 soda ash, and 10 soap = 100 per cent. The goods must be rolled and lie overnight. Run again the following morning in a similar liquor and then run again immediately and without washing through a solution of chloride of lime at 1½ degrees Tw. To every 100 gallons of this chloride of lime solution add ten pounds of magnesium chloride and five pounds of acetic acid. If not white enough after lying an hour or two, repeat this

chemicking, do not sour or wash unless absolutely necessary, but mangle through hot running water. All these operations should be conducted on a machine similar to Fig. 1 in Part 2.

In this case the chloride of lime cannot be used over again and must be run out because the chloride of lime and the chloride of magnesium mutually decompose each other, rendering the lime neutral. Now a neutral solution of chloride of lime is not stable, it will not keep; in other words, it rapidly loses its strength by the decomposition of its elements and the gradual loss of its chlorine, therefore it will be obvious that the chloride of magnesium should be added to it only at the moment it is being used on the goods and should in no case be added to the storage tanks. The chemic must, of course, be added continuously to keep the strength up; therefore it is best to add the magnesium, previously dissolved, to the chemic in the box while the goods are being run. No fear need be entertained in regard to the white precipitate caused by the magnesia; it has no deleterious effect on the goods, and it is easily removed by the subsequent washing.

Magnesium chloride, used in conjunction with chloride of lime, increases the activity of the bleaching powder, but above all, it removes the excess of lime, changing it into calcium chloride, and it thus prevents the very injurious action of lime on textile goods which causes the formation of oxycellulose with the ultimate tendering of the goods.

I have shown that we steep the goods in castor oil soap and soda ash, and that we then run them in the chemic without previous washing—they consequently contain a quantity of free soda. Now this soda is opposed to the bleaching action of the chemic, but by the addition of magnesium chloride to it we destroy the excess soda, and set the hypochlorous acid free to act with energy, while the magnesium resulting from the reaction has no injurious effect on the fabric and is easily removed by washing.

(This is the third of a series of articles on this subject by Mr. Nanson. The remaining articles will appear in subsequent issues.—Editor.)

Weavers' Sectional Meeting at Shelby

A practical discussion meeting on slashing and weaving was held by the Southern Textile Association at the Cleveland Springs Hotel, Shelby, North Carolina, on Friday, August 24th. While the attendance was not so large as usual, a representative number of southern operating executives were there and participated in the discussion, which was certainly up to standard in every way.

The discussion in this meeting was closely confined to definite problems relating to weaving and slashing, and one feature was the manner in which problems brought up by members of the audience were discussed.

W. H. Gibson, Jr., chairman of the weaving division of the Association, presided and directed the discussion in his usual able manner. James A. Chapman, Jr., and Marshall Dilling, president and vice-president respectively of the organization, were present and took an active part in the discussion. The following paragraphs give a seriatim report of the discussion:

The first question presented by the chairman for discussion was: What is the minimum amount of waste per beam for section beams back of the slasher? Chairman Gibson called on Harry H. Boyd, general superintendent, Chadwick-Hoskins Co., Charlotte, for a statement regarding this question.

"We have discussed at several meetings the question of the amount of waste we have and should have on our section beams from the warpers," responded Mr. Boyd. "I think it was down in Greenville we were discussing this, and some gentleman raised the question, and I made the statement that anything in excess of one-half a pound to the beam would be excessive waste to have left on the beams back of the slasher. At Asheville another gentleman said he had looked back of his slashers and found the bearings that hold the beam were too tight. By remedying this he said he cut his waste down to one-third of a pound per beam. That's getting it down pretty close, boys; with him doing that some of us who are running a pound to the beams are in pretty bad shape."

In responding to a general question following Mr. Boyd's remarks, L. L. Brown, general superintendent, Clifton (S. C.) Mfg. Co., said he found his beams varied about five pounds each way in weight; that is, beams supposed to weigh 365 pounds varied from 360 to 370 pounds, on 30s yarn.

No one in the meeting was making less than that, it was indicated after a question by Mr. Boyd, and he next asked if anyone had ever run a set of beams from the same warper and with what results.

J. V. McCombs, superintendent, Buffalo (S. C.) Mills, stated the variation was from three to five pounds, and that the waste was 3¾ pounds on five beams, on numbers ranging from 5.25s to 18.5s.

Mr. Boyd recalled that "some time back we had a discussion on variation in the numbers of yarn. Some folks did not believe their yarns varied over three per cent, but they found out different. Now, do you attribute the variation in the weight of your beams to the unevenness in yarn numbers, or to the variation in the length on the beams?"

"I attribute about as much one way as the other," was the response of Mr. McCombs. "However, while I know the yarn varies, I would be inclined to attribute the biggest percentage of the variation to the tension on the yarn on the warpers and slashers. I think both are big factors. That's the best way I've been able to figure it out."

"What do you say, Mr. Gibson?" asked Mr. Boyd of the meeting chairman.

Mr. Gibson failed to agree exactly with Mr. McCombs. "I would think that the great majority is caused by uneven length in the yarn," he said, "not so much in the variation. The yarn may vary considerably if you take four or eight or twelve bobbins, but when you get hundreds of them you get a pretty good average, and I cannot see where one beam would vary so much from another in numbers." He then described an arrangement he had seen where a man had put a double worm gear on the measuring roll of the warper which proved very satisfactory.

R. T. LeGrand, superintendent, Shelby (N. C.) Cotton Mills, said he had found his variation, in using a number

of beam warps from the same warper, to run within a quarter-pound, and J. H. Bagwell said he had found in running beam warps, 50s single yarn, it will not vary over one-half pound, using 3,000 yard warps off of one creel. He said he had not had it over 2½ pounds on 16s yarn at the back of the slasher. Mr. LeGrand added that in making some warps for the weave room he had found they would vary from five to six pounds to the beam. He explained further that they use a 30s/2 yarn, and that in doubling they doubtless get out some of the variation. "We do not have as much strain on the Denn warpers as on the chain warpers," he said.

"I am not engaged in weaving at present," said Mr. Dilling, of Gastonia, "but I have recently installed two double ball warpers, with the balls driven together with positive drive, and I have a counter on each, but I find that we cannot get two warps on the same machine to run out the same." Mr. Dilling explained that the counters are attached to the condensing stand on the warpers, and that the drive is a friction drive. The counters, he said, will measure the exact number of yards wound. He said the rolls on one machine are cast iron turned down, and on the other wooden rolls covered with leather are used. The latter, he said, seem to turn off better work, after being adjusted right, but that they are more difficult to get started correctly.

With regard to slashing, Mr. Dilling continued: "I think the trouble is from the measuring device on the warper, and the tension on the different beams on the slashers, because your waste is made by one beam running out sooner than another; it is not caused by the variation in numbers of the yarn."

Regarding Mr. Dilling's own problem, the chairman asked if he found the yardage ran better at times than at others. "Yes," replied Mr. Dilling, "the atmospheric conditions have a good deal to do with it." At this point he reiterated that "I believe we are going to find that the variation in the amount of waste at the slashers is caused by the tension on the slasher beams and the inaccuracy of the measuring device on the warpers."

"Right along that line," contributed President Chapman. "We always make a short beam on the back beam because of the friction. We found that beam would always have more waste on it so we have cut down the length on it. This has helped us considerably."

"Up at Asheville," said Mr. Brown, "a gentleman said we have been too long a time laying it on the warper and the measuring roll, and that it was his opinion that the majority of it was caused by different friction on different beams.

"Now I always get inspiration at these meetings, so I went back home and over to our No. 1 plant and told the slasher man I wanted to see the next two or three run-outs, and then I had an idea. I had him weigh the yarn left on each individual beam for a week. I found there was one certain beam that ran out 70 per cent of the time first. That was the beam that was causing most of the waste. I found that one beam had more weight than any of the rest, and next was the bottom beam next to the size box, but the beam that had the least was the last bottom beam." He said that he put a little weight on it and reduced the waste from six to four pounds an average from six beams to the set.

The chairman asked if anyone had heard of a better measuring device for warpers, and whether anyone knew of any better scheme for friction on the creels back of the slashers. He said he understood that there is being produced a creel with ball bearings and special friction so that when the slasher is slowed down it automatically puts friction on all the beams, and when the machine is started up the friction is released.

Mr. Dilling raised the question as to how much tension there is or should be on each beam. "I have thought if you knew how much tension you had on each beam you would come nearer getting at it," he said. "You may have the same weight but more friction on the different ropes. If you had something to measure the tension and friction I think you could get the tension nearer the same and get better results if you knew exactly what you were doing with each beam."

Stephen Arleigh, of Charlotte, stated that he had visited a mill some time ago and secured this experience: The mill was having too much waste at the slasher, and in an endeavor to reduce it, they tried putting three rollers under the section beams and bringing the yarn straight down from the beams under these rollers instead of running it over the adjacent beams, and have an individual friction for each beam. These rollers were very close to the floor, he said. The idea was to make the beams run out more closely together, and this mill, he said, had practically eliminated all the waste at this point. Considerable interest was manifested in this, and Mr. Arleigh, responding to questions, stated that this had been running for about three months and that no difficulty had been experienced so far.

Another method of arranging the beams behind the slasher was described by H. E. Runge as being in effect at the Trion Company mills at Trion, Ga. Mr. Runge said that these mills were fortunate in having plenty of floor space behind the slasher, so they put all the beams on the same level behind the slasher, so that all the yarn comes up in straight lines instead of going over and under other beams. He said that this plan reduced the pounds of waste considerably, and recommended it to mills having sufficient room to do it. "It is a very simple arrangement and very easy," he said, "but it is a matter of room in being able to string them out in a continuous line. By having them all in the same line they have the same tension."

"I have seen that tried out and it works very satisfactorily," added S. C. Thomas.

Mr. Gibson asked whether anyone had tried using ball bearings in the slasher creel, but there was no response. Next he exhibited some "tails" showing the use of three pieces of gum paper so that the loom fixer might know where to cut off the warp. Mr. McCombs added that this system reduced the waste quite a bit.

The subject next discussed related to storing beams. Several men complained that they were experiencing quite a bit of waste, and Mr. McCombs said that he carries from 400 to 500 warps in stock and that he laid a track and sets his beams on end and trucks them into the storage place, and that it works mighty satisfactorily. He said, in response to question, that while he had not figured whether he could store as many warps in this manner, he could take care of all he could get ahead.

The chairman next asked for figures on waste from warp run-outs in the weave room. C. R. Riddle, of Columbia, S. C., said that his percentage of warp waste was .47

of one per cent figured on the total production of the mill, and that his tying-in machine waste was .16 of one per cent.

Mr. Riddle further read some figures showing one mill's record of .15 of one per cent waste at the back of the slasher, and hard waste at the slasher .07 of one per cent figured from the input of the mill, exclusive of bagging and ties. He added that he would like to have the other superintendents and overseers figure up their records, as he didn't know whether his was high or low. He makes 30s yarn.

"Looks pretty good," commented Mr. Brown.

Mr. Chapman raised a question with reference to positive driven slashers. He said he had tried them but had discarded them and had gone back to the ordinary drive. He also asked for experiences with ball bearings on slashers.

H. L. Thackston responded that it takes a lot of strain off the yarn—referring to ball bearings—and he said that before they put ball bearings on they had to take a lever to turn the cylinder over but that now it can be done with a hand. "You can tell a difference in weaving," he continued. "It increases production and reduces seconds and causes better satisfied weavers. The yarn is not stretched nearly so much."

Someone asked whether the cloth was any heavier after installing the ball bearings, and the reply was that no tests had been made on this. No one responded with regard to the question on positive driven slashers.

Mr. Chapman next asked with reference to regulators on slashers. Mr. McCombs said, "Absolutely, we get better results with the automatic regulation on the slashers, and we have a saving of 27½ per cent in steam on account of it."

"Another thing," continued Mr. McCombs. "I made the mistake at first. I noticed that right down at the bottom of the beam that a few yards were mildewed behind the drop wires. I was pulling on my slashers before they got hot. So we run on slow speed for fifteen minutes, and we haven't seen a damp warp in months. I am getting better results than I have ever gotten by two or three per cent and I cannot attribute it to anything but that."

"We haven't had a damp warp since we installed regulators on the cylinders," said W. C. Rowland, overseer of weaving at the Union-Buffalo Mills, "if the slasher man will wait until the cylinders get hot. I believe our weaving is running better and I think they are a good thing."

"We have them on six slashers," added Mr. Gibson, "and I have noticed that we would be running with one pound of steam or less and probably we had four or five pounds. Pressure doesn't always mean heat."

"Now about control in size boxes," said the chairman, in passing on to the next question. He requested a statement from Mr. Chapman.

"Well, I know they help," responded the president, "because, if we keep the temperature constant, they are bound to help, if you get the right temperature to start with, so anything that will keep it at the correct temperature will be a good thing.

"At the same time we put them in we also installed recording thermometers on the size kettles, so we could check up on the man who was cooking it. I like it in connection with the circulating system."

Mr. Riddle said that he has the circulating system and thermometers, and that they think so much of them that they are keeping them on. He said that his production runs about 98 per cent on 68x72 and 88-squares, and he knows that his temperature has not dropped less than 204 and not over 212, although they have changed size, but not starch, in 18 years. He thought that a good bit of it depended upon the grade of tallow used, and the temperature under which it is cooked. He said that, according to his tests, they had found that about 210 degrees is the best temperature to size a warp in, for 30s yarn, but that they had not adopted that as a standard because they are always open to conviction.

"Talking about recorders," said E. A. Franks, "we had them on the size vat but took them off because the slasher man depended on them altogether, and we just decided that we could get better results without them—and we did, after we took them off."

Mr. McCombs said that with the regulators his size runs week in and week out and doesn't vary beyond the limits of 208 and 210 degrees. "My men depend on them and I haven't had a soft warp in over two and a half years," he said.

"But I don't know whether our steam conditions are the same," said Mr. Franks. "We do not use any live steam for the slashers. We use the exhaust from the engine and we won't carry on that line ten pounds, and we have three slashers on that line."

"Three years ago we had about that same condition," Mr. McCombs said, "and we found that our condensation was very great. I put in a trap on the line to trap the condensation off, and it increased our heat units. We used to have to run from 10 to 12 pounds on the slashers to dry the yarn, but after putting in the trap we never run over six or eight pounds." Mr. Riddle said that his slasher is 640 feet from the boiler and that he put in a trap and found that it improved conditions. He added that the steam comes from a heater.

"In regard to steam going to the slasher," said Mr. Brown, "it is very important how you get it there. In one of our plants our steam line comes overhead and then down to the cylinders and we found that we naturally got all the condensation into the cylinder. After changing the line from overhead to underneath we were able to increase the speed of the slasher. To be exact, we speeded them up from an 18 to a 22 production gear, approximately 20 per cent increase in speed.

E. A. Franks, superintendent of the Drayton Mills, Spartanburg, S. C., asked for the best method of running several short sets, say, four or five beams in sets, solid colors or stripes, about 6,000 yards, probably with three to four different styles on one set.

In a similar case, said W. D. Jenkins, of Shelby, in order to keep the knots at the change of colors all straight instead of tying-in all at one time in the usual way, he started tying-in first the row of tubes at each side of the creel farthest back, then moving the beam forward until these knots came in line where the second row of knots would be and so all along until the creel is all renewed. By creeling in this way, it was pointed out, one gets all the knots parallel or straight across.

The next question brought up was from Mr. Brown, who asked whether anyone had used distilled water in sizing.

"I think it has been talked about but it has never been

tried down here," said the chairman, but asked for discussion.

Mr. McCombs said that once in making coutils for corset linings he found it necessary to treat the local water with a preparation that softened it, and that where they had been having difficulty in getting the size to stay on the warps, this method improved the slashing wonderfully. He said he has recently been contemplating trying the same thing at his present plant but hasn't done it yet.

A statement to the effect that a number of northern mills are using distilled water for slashing on fine numbers was made by L. P. Batson.

"What is the average opinion about the circulating system?" was next asked by the chairman.

"I have tried several kinds," responded Mr. McCombs, "and I find that the gravity system is most successful."

"We installed the circulating system about two years ago," said Mr. Chandler, "and the best thing we found was that it paid for itself that first year. I think it improved the running of the work."

"Do you have make-up kettles and storage kettles?" asked the chairman. "We have ours in the basement," was Mr. Chandler's reply. "They are underneath the slasher and we have two storage kettles and two make-up kettles. We make it up and pump it into the vats and then run it back into the storage kettle by gravity." Mr. Chandler added, in response to further query, that he has the closed coil to heat the size in the storage kettle.

"What is the proper speed for a slasher, how much steam, and how many yards per minute?" asked the chairman. He recalled that at the Anderson meeting, Mr. Beacham had declared that "you can't run a slasher too fast," and added that others do not run them so fast.

Mr. Thackston expressed it as his opinion that "the faster you run the speed the better warp you get. I have never got it too fast. We run them nearly as fast again as we used to run them." And he said there was no complaint when the warps got to the loom.

"What is the size of the sheet going over the slasher?" asked Mr. Boyd, "also the amount of steam?"

"We have not got a recording system," responded Mr. Thackston, "but we run about 3½ pounds with 1,700 to 2,600 ends to the warp, on 30s yarn."

"Talking about the speed of the slasher," said Mr. Franks, "it depends on the number of yarn you are running. You might get better results on 30s yarn by running the slasher fast, but when you get onto 60s or 70s, with 6,000 or 7,000 ends, you will find a great difference, because you have to prepare the warps differently."

Mr. Brown asked for specific speeds, for comparative purposes, and Mr. Riddle stated that they run their slashers, making about 40 yards to the cut, running six pounds of steam, on 29s yarn, so that they finish in about 55 minutes. "In my judgment," he said, "the speed of a slasher depends on the numbers of the yarn. I think every one will agree that the faster you run them the more steam you have to carry."

The Afternoon Session

was opened at 2 o'clock by a discussion of methods to eliminate reedy cloth. A large number of suggestions were made by several men who took part in the discussion. Mr. Riddle, of Columbia, began the discussion by asking for suggestions. The chairman stated that oftentimes there is a difference in the cloth when woven on different kinds of looms and with different kinds of stop motions; that is with the double bank and single bank stop motion. He asked how many in the audience were using the double thread, single bank stop motion, and none indicated that he was, while ten men made a show of hands when asked how many were using the single thread, double bank stop motion.

In discussing Mr. Riddle's problem, C. J. Moss stated that "we have some A model Draper looms with the single thread stop motion, and while we have trouble with reedy cloth, we haven't had any kicks on it yet." He indicated that he uses a high sand roll to eliminate the reed marks. Chairman Gibson stated that he uses the high sand roll, also. Another gentleman added that he gets better results with the high sand roll.

It was the opinion of Mr. Boyd that the reed marks should be eliminated by the use of a high whip roll.

Mr. Franks said "There are different ways of adjusting the loom to put a 'cover' on the cloth. You can sometimes take care of it with the whip roll, sometimes you have the two bank, single thread stop motion, and sometimes you have the four-bank stop motion. You can make a better piece of goods on the four-bank than the two-bank stop motion." He added that in instances he had eliminated reed marks by raising the whip roll or adjusting the drop wire stands. He was strong in his recommendation for "reeding it single in the dent." By doing this, he declared, a soft twist filling can be used and a lot of difficulty eliminated. He said this will give the cloth a "cover" on both sides. "You can put a cover on it with two to the dent, but you turn it over and it will be on one side only. That is not what they want; they want it the same on both sides."

"Speaking from my personal observation," said J. H. Bagwell, "I have never been able to overcome reedy cloth with adjustments of the sand roll or whip roll, and I have never seen much difference as to the different stop motions, two or three bank. You can take the same style stop motion and the same style loom and go up and down an alley—with the whip roll and breast beam set exactly the same—and some looms will be weaving perfectly and others will be as reedy as all out-of-doors. It has always been my experience that in 75 to 80 per cent of the cases, reedy cloth is caused in the setting of the harness. You can set a harness tight and it will make reedy cloth if you loosen it properly you will eliminate the marks." Mr. Bagwell responded to a question by saying that he had never had experience on wire harness and that his reference was to cotton harness.

Mr. Bagwell further pointed out that in making a herringbone weave, sometimes reed marks will show up in one of the twills while they will not affect the other twill at all. Mr. Jenkins declared that the twist in yarn affects the twill; in herringbone, for instance, where there is a right-hand and a left-hand twill, he said that with regular twist the left-hand twill will not show the twill effect that the other does, while if reverse twisted yarn is used, the desired result will be secured.

Reverting to Mr. Riddle's problem, Mr. Simpson asked "have you ever tried raising or lowering the drop wire stands?" Mr. Riddle replied that he had experimented with moving them forward and backward.

"I think if you will set the reed 3¾ inches from the fell of the cloth you can get the reeds out by raising the drop wire stands," continued Mr. Simpson. "If you can't

get it high enough with the hole already there, put a piece of wood under the stand. We had a lot of trouble and did this and it eliminated it considerably." Mr. Davis agreed with Mr. Simpson that this would also effect reduction in reed marks. T. F. Hoy related an experience of 1919 when doing inspection work for the government. He said that at one mill "they were making the most perfect work I have seen by having a block of wood about ¾ of an inch thick under the drop wire stands. It was reeded two threads to the dent but it looked like single dent weave."

Mr. McCombs brought up the question whether raising the drop wire stands would not "raise cain" with the harness. Mr. McCombs expressed the opinion that running single dent was the only way to eliminate reedy marks. "I don't believe anything else will do it," he said.

After the discussion on reedy cloth, the next subject brought up was pick counters. The chairman asked for experiences on these, and E. M. Walter, superintendent, Chadwick-Hoskins Co., stated that he had them on 150 looms and likes them very much. He uses them on day and night shifts, he said. Summing up the advantages, he said that "you get a better product because each weaver gets paid for just what he does. It is much better than dividing the cloth usually between the weavers on the two shifts. Where I have the counters on I get more cloth than where they are not on. When a loom stops the weaver hustles more than he used to."

Mr. Chapman, of Inman, said they have tried out an installation of about 25 pick counters and think so much of them that they have ordered them for the remainder of their 1,000 looms. Mr. LeGrand said that instead of pick counters, he separates the cloth and marks each weaver's production and figures it on the folder. Mr. Chapman responded that it would be impossible to do that on a thousand looms.

Mr. LeGrand stated that he would like to know of a method for marking the cloth without interfering with the bleaching of it at the finishers. Mr. Runge suggested using s'asher ink, and Mr. Riddle said that pure chalk with sulphur in it would serve the purpose. Further explaining his method, Mr. Runge said that "it is the same thing used to put the cut marks on the cloth and can be used by giving each weaver a number."

"But we have the same trouble with cut marks," said Mr. LeGrand. Mr. Franks said he used slasher tape and had each weaver's name put on and then the tape stuck on the goods to be pulled off in the cloth room. The objection offered to this by Mr. Runge was that some of the glue from the tape would remain on the cloth.

Reverting to pick counters, Mr. McCombs said he put them on 25 looms and that the rest of the weavers are calling for them. He said his experience was that formerly the day weaver said the night weaver was laying down on him, but after installing the counters he found that in reality the night weaver was beating his production.

Chairman Gibson threw out the suggestion of using a single thread in the selvage where double threads had been used before; that is, "if you are running 30s warp and running two threads together in the selvage, instead of doubling the threads in the selvage, use the equivalent or a 15s. It is supposed to make a stronger selvage." Mr. McCombs asked how it would be kept from piling up at the slasher, and Mr. Gibson suggested spreading it and skipping dents in the comb on the slasher.

The next question raised was a good method for keeping filling fork racks clean. Mr. Chapman brought it up, explaining that he had an old system of humidification in the weavers' alleys, and saying that it took four men to keep the racks clean on 1,000 looms. He said they had tried nickel plating and copper plating so the lint would not stick to them, but without much success.

"Best thing I ever saw for this was at the Ivey Mill," responded Mr. Bagwell. "They have a revolving brush that does the work."

Mr. Davis said he has a little brush that comes up from the pittman roller and comes in contact with the filling rack, "and that cleans it, too."

"How many have to clean the filling racks?" asked Mr. Chapman. Mr. Riddle responded that he had not cleaned one in eight years, but that he has a humidifying system that prevents their clogging up. Mr. Chapman said he has to clean them every day and he uses a rag and gasoline. Mr. Thackston reported cleaning them about once a week. One man expressed the opinion that the humidifiers had a great deal to do with it. He said he had found his biggest trouble where the humidifiers were over the weavers' alleys.

The next question was with regard to the life of a shuttle. Mr. Chapman, answering this, said that he had found a shuttle lasted about 11 2/3 months as an average. Mr. Gibson reported a record of 1.2 shuttles per loom per year on looms that had been run about ten years.

Mr. McCombs asked figures on the life of shuttles for 90-inch looms. He said he averaged about 12 shuttles a month on 100 looms.

"How many check straps per loom per year?" the chairman asked next. He read a report showing the use of 1.23 straps per year per loom, using an oak-tanned, medium weight. Mr. Walters read his record, which was 1.08 straps per loom per year.

The question of whether a better strap than oak-tanned might be used was raised by Mr. Brown. He said that "last year we used 800 pounds of check straps on 2,000 automatic looms, and this year, up until the other day, we had not bought but 300 pounds of check straps. Since we have quit using the oak-tanned strap the lesser amount required is noticeable. I find that other tans will last longer than the oak-tanned." He added that his preference is a chrome tanned leather.

Mr. Gibson next read a report showing the use of 2.96 leather pickers per loom per year, and Mr. Walter stated his was 2.20. Mr. Walter further stated that his record on picker sticks was .9 stick per loom per year. In this connection, Mr. Rowland raised the point that the life of a picker stick depends on the kind of wood; he said old hickory will not last so long as young hickory.

The chairman asked for opinions on weaving filling wind compared with warp wind. Mr. McCombs said he had noticed an improvement in breaking strength in running filling wind; that it is better, the conditions are improved, and the work runs better in the spinning room.

This concluded the discussion and the meeting adjourned.

Proper Lighting for Inspection and the Inspection Control of Quality

BY HIBBARD S. BUSBY.*

Most artificial illumination in industry, and in textile mills in particular, is for the obviously necessary purpose of showing the location and arrangement of the property, machinery, etc., so that work of various kinds may go on unhampered by people running into each other or into the equipment. This seems like a rather absurd statement and yet its truth is apparent in some of the misguided lighting installations which sought to "economize" by concentrating the lighting directly over the units where work was under way and neglecting to provide for general (all the room) illumination. Fortunately this error has been appreciated before such practice became very extensive and the accepted method today is to provide both general and concentrated-on-the-work illumination. It may be said, however, that the most efficient lighting for general working conditions is the one which most nearly approaches the ideal condition of general illumination of the proper strength. Your proof of this fact is unmodified daylight.

On the other hand, the business of inspecting anything, obviously with a critical viewpoint, is a careful operation and requires that the system of performing it live up to certain hard and fast requirements. Otherwise the inspector could not find out any more about your material (not being a superman endowed with special insight) than does the weaver who watches a little section of the cloth at a time gradually form with each additional pick thrown. Your weaver is not your inspector, not only because he is occupied with his own specific duties, but because you want to put your cloth through a more rigid scrutiny before it goes out as the living advertisement of your name and standards of doing business.

In order to determine just what inspection should cover, and how it should be done, it is necessary to be fully aware of what inspection is, and what object it strives to attain.

Purpose and Scope of Inspection.

In the course of a fairly general mill experience and a consulting practice of wide range, a great many different sorts of materials have been encountered. Each has its special requirements—the first week's experience in silk is not soon forgotten, when an "old timer" said: "These things may be all right on ordinary (!) materials but silk is different; it has a sheen"—but all of them have points of attack in common. However, the problem will be considered from the point of view of raw fiber, standard white cloths, yarns and prints.

Inspections may be divided, roughly, into two general types, those for general classification of goods and those for the various ranges or properties into which each classification falls. To illustrate:

Piece goods are classified by general type of weave. They are also classified as grey goods and finished goods (with whatever modifications of the type of finish may be called for).

Under properties of cloths we are concerned with grade or condition, regularity, color and degree of processing (mercerization, bleach, size, print, etc.). These latter factors are the ones which give the trouble and argument in inspection—not much controversy arises as to whether a material is a denim or a madras, but heated argument develops on the point of proper bleach, size and the like.

If you consider how cloth making and, in fact, all textile manufacture has developed, from the primitive hand-worked fiber, then natural-colored cloths, then simple dyeings and finally prints and jacquards, it is plain that the quality, or inspection, problem throughout most of these stages was negligible—being chiefly a matter of adherence to care in workmanship. Indeed, the factors (or variables) in the problem were added very gradually up to the time when, coincidently almost, discoveries of processes of machine-finishing, aniline dyes, and means to produce goods in tremendous volume bunched the problem and put a dozen new factors into it in a single generation—without either time to absorb each one gradually (or to thoroughly understand it, even) or to handle it, at the rate it was being produced.

As things settled into smoothly-running order a study was gradually made of these matters and the last few years of textile production have witnessed earnest research into the matter of defining each of these effects, their cause, and specifications for the production and the maintenance of them.

It is an outcome of this trend that has developed the science of inspection and standardization, in which much that is worth while and of a practical nature has been developed.

The Science.

To begin with, it was apparent to technical people that no standardization or improvement of a definite nature which could be kept in clearly understood record form would be resultant until each type of defect was defined in exact, measured terms, and standards were worked out to which each successive lot could be compared. The first problem for the engineer was the determination of what did actually exist; second, what ideal of attainment should be striven for, and third, measurement in terms of numbers and other well understood units of notation.

Immediately the technical man jumped to the use of his accustomed tools, gauges, magnifiers and the other usual paraphernalia of the chemical and physical laboratory, and thereby, in one stride, outdistanced the competition he faced in the methods which were not referable to any definite basis of comparison.

Prejudices were at once encountered, and not all were unfounded. It is not, necessarily, an easy practical thing to ask men (who can tell from feel and view of thousands of samples the approximate degree of quality) to change abruptly to measured methods. In fact, it requires that the "old-timer" shall learn the technique and aid its development with his friendly criticism. The advantages of a measured system of grading can be shown him and most reasonable men shortly come to place dependence upon it. One great difficulty that is still encountered in this prob-

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lem is where the "old-timer" has been sold some particular instrument (recommended as a cure-all) and then has found, to his disgust, it is not even a help-all. It is inevitable that he should become disgusted with all such things; as a result, the work of the consultant is thereby made much harder when he comes in to study the problem and recommend the proper equipment.

Some instrument manufacturers have set up a very difficult background in which to do improvement work. In their eagerness to sell a particular instrument their efforts frequently result in selling none at all. If the analysis of the problem were placed with someone familiar with plant operation there is a much better chance that all parties to the transaction will be better served, ultimately. Besides, no instrument house in America possesses a service department with sufficiently broad industrial and quality engineering experience to, unaided, decide these matters with a high average of correctness.

Probably the greatest difficulty encountered by the "old-timer" in changing over to new methods is to get himself into the way of realizing one element of quality at a time (which is the thing a measuring instrument defines) as against a general (though only approximate) total rating of the quality of the sample he is inspecting. Some instruments will, indeed, make a number of kinds of measurements, but usually only one at a time.

The real test of the value of the technical method of grading is that its performance (its readings) be uniform for the same degree of quality and that the records of these tests be possible of permanent registration.

Another serious difficulty in grading is that some grading is done as of "groups" (i. e., a group is assembled of average uniformity, regardless of any fixed standard) rather than "to a standard" (comparing each piece of production to a fixed, measured standard). Until the method required by the trade is understood by everybody concerned, a great deal of difficulty is experienced in setting fixed standards of any kind.

There are numberless points in favor of exactly measured methods of grading. Speaking in dollars and cents, these methods are economical because no leeway is left open to the possibility of necessitating regrading. They are certain, because measurement, when accomplished, is a positive thing and not a matter of opinion. It gives "registered" grades in place of varying opinions. It is a source of strength as a defense in any controversy concerning the nature and degree of delivered quality which may eventually arise from unscrupulous customers. And finally, it is a never-increasing source of good will. Dealers and the consuming public prefer and will demand a definitely standardized product, when they can get it, in preference to an unstandardized one, all other factors being equal, and even frequently when all other factors are not equal. Therein measured quality is a mighty force and basis of advertising.

Technical methods of inspection must meet certain critical tests:

They must be better, on the average of a period of use, than the old "skilled" grading.

They must, therefore, be able to stand favorably parallel tests with the older methods and come out the victor.

They must be independent, to a large degree, of the person making the test. If a trained engineer is required to operate them after installation their worth, as a financial asset, is in most cases thereby decreased. They must actually be possible of operation by someone no higher in the scale of position and wages than a regular inspector or grader.

Finally, they must be simple of operation. The story is still told, in a certain plant, of a systematizer who had spent some time explaining to an old workman (whose ability to use English was very limited) that he must mark down the readings shown by the counter on his machine every time he changed his job-run. Not being able to get the idea across successfully the systematizer finally told the man to mark down the numbers every time the machine started and stopped. Following these instructions the records were made all week, also on Saturday (the day when all production stopped and machines were given a general cleaning).

In cleaning a machine it was necessary to start it for a short run in order to move certain parts into view, then stop it and clean those parts.

On Saturday noon the man turned in a card which seemed to indicate that work had been performed and that the part of the job (the run on his machine) which ordinarily took forty-five minutes to accomplish was done in no time at all, starting and stopping times having registered at the same point on the dial of the counter, because of the short run given the machine during cleaning.

And the man complained that he "no got time put down all the times!"

Inspection Lighting.

The most fundamental problem in properly setting up a system and a unit for inspecting for quality is that of the lighting necessary to realize all the elements required in successful grading. The function of this lighting is at once to detect and to differentiate, and to secure this result only the units specifically adapted to the work are permissible.

Here the problem is one of localized concentration of the proper light upon the area in which the work is situated, therefore, the unit is not of the type adapted to general illumination, but is a specialized one, for directing the light in the proper manner and degree upon the work.

Under such a condition of concentration the worker is necessarily somewhat at a point of being keyed-up that results in a mood easily affected by minor things, such as in the quality of the light, which would pass unnoticed in general illumination. Therefore it is fundamentally required of the light that it be of a character such as to stimulate vision rather than to limit it or to restrict its range. Also it should enable a sustained degree of keen scrutiny over a long period. (This is a basic requirement in all work requiring a high degree of skill—a reason why much of such work has been done only in daylight in the past.) Illustrating this point, the writer had to do a great deal of reading of fine print (newspapers and technical journals) at one time, in the course of a research. While it was noticeable that the eyes rebelled at this heavy task under ordinary artificial light, when one of the lamp-units used in inspection work was substituted for the ordinary artificial unit it was possible to carry on, without fatigue, for nearly twice the usual length of time.

Certain very definite qualities are required in a light-

ing-unit of this sort. First, the region it illuminates, which must be somewhat dependent upon the size of the articles being inspected, must be sufficiently larger than the actual area under inspection to render uniform light over all the inspecting area, and so that too sharp a contrast may not be presented between the area lighted with the special quality type of illumination and the general illumination.

The strength of the light must be sufficient to provide for clear vision, and yet not so great as to cause fatigue.

The most important matter is the nature or quality of the light itself. As mentioned earlier, unmodified daylight is the most desirable working light. Recent improvements and developments in artificial light have produced daylight lamps of a quality so close to actual daylight (north sky reflection) as to be highly desirable for adaptation to this type of work. They are suitable of expansion to the size of work required and at the same time the source of light is an ordinary commercial lamp, therefore, they are easily maintained.

The effect of this development has been to put within the reach of the mill man a means for grading his work, and upon which to base his measured inspection. It is one of the foremost contributions to the science of improving and standardizing quality in the whole history, to date.

It is pretty generally admitted now that the more accurate the knowledge of costs of a business the better its status and position. Where quality is more rigidly controlled and defects detected with a higher degree of certainty, as well as at the earlier stages of process, the resultant product averages higher in per cent of first grade quality, and the operating cost per given pound of stock, in proportion to first quality goods produced is lowered.

These methods furnish a basis of maintaining a higher degree of operating efficiency per department by enabling correction of defects at the point they occur, instead of waiting until the entire cycle of operations is completed.

They become a basis for establishing fixed specifications for the purchase of raw and contributory materials entering into various parts of the process, because all entering material can be subjected to tests conducted on this basis.

A singular effect is produced by them upon the personnel of a mill, reacting advantageously upon the morale, the discipline and the confidence of all the workers affected, in their management. They feel that their performance is not then rated upon opinions, but upon fact, and respond to the challenge with a higher degree of individual and team-work efficiency. Particularly is this of assistance in adjusting relative scales of wages and other rewards for performance, and developing that primary objective of the best organized plants—*esprit*. In this sense it is the greatest visible single force underlying the ever-present problem of satisfaction with the job.

As a "value" feature in the business, reliance upon such methods has the advantage of permanence and independence of time or existing worth of the dollar. These methods are, moreover, a barometer of tendencies in qualities of stock available for manufacture and those desired by the ultimate consumer, and as such, feel the pulse of both ends of the business.

Competition is ever with us—and knowledge is, in this, more than in all other things, power. To know with what you compete and when you have successfully passed the competition point is to win before the judges announce the order. To be able to go into a market on the slogan of producing a degree of quality that is backed with methods which assure of its performance is a fundamental of present-day merchandising which insures success.

Presents Loving Cup to Col. Springs.

Col. Leroy Springs, of Lancaster, S. C., was given a deserved mark of esteem on September 25th, when he was presented with a silver loving cup by the superintendents and overseers of the Lancaster Cotton Mills, of which he is the retiring president. The party drove to Col. Springs' residence where F. Gordon Cobb, general manager of the mills, presented the cup and at the same time Mrs. Springs was presented with a bouquet of American Beauty roses. Mr. Cobb in presenting the cup said:

"Col. Springs, if the reports in the papers are true, you are about to withdraw from active management of the Lancaster Cotton Mills. Please understand that your superintendents and overseers have not come here tonight to bid you good-bye, for even if you were to leave us in person, we shall always feel that your influence is with us. It would be impossible to even say 'Lancaster Cotton Mills' without at the same time thinking of Col. Springs. To us the two will always be the same, it matters not who the managers may be.

"In the Lancaster Cotton Mills you have built a temple which will stand practically forever to commemorate you, but probably you do not realize that you have built a far greater temple—a temple in the minds of your superintendents and overseers—your name—your attainments—will be used to inspire our children and our children's children. That is a temple far greater than any material thing. The Lancaster Cotton Mills claim the distinction of producing more production per spindle than any mill in America and these are the men, Col. Springs, who deserve the credit, not only for the efficiency of their individual departments, but for working together as a unit, therefore, in behalf of the superintendents and overseers, it gives me great pleasure to present you with this loving cup, not for its intrinsic value, but as a small token of the high esteem we hold for our employer.

"And, Mrs. Springs, as we consider you a true example of the proverbial better half, all that we have said to Col. Springs applies equally to you. We have not forgotten the terrible epidemic and how you came to us at the risk of your life in time of sickness and need. The English language does not seem adequate to express our true feelings, but we hope that these beautiful roses will carry to you our message of gratitude and appreciation."

Col. Springs, though taken by surprise, was deeply touched and in a voice choked with emotion, he thanked the donors and stated that it was through their loyalty and cooperation that the Lancaster Cotton Mills was the successful plant it is today, and though Lockwood, Greene & Co. had recently purchased the mills, he had retained a large interest and there would be no change in the personnel of the heads of departments and that Mr. Cobb would still be the active head of the plant.

The cup, of solid silver 24 inches high set on an ebony base, bore the following engraving: "Presented to Col. Leroy Springs by the superintendents and overseers of the Lancaster Cotton Mills, not for its intrinsic value, but as a token of the high esteem we hold for our employer."

Operating Executives Meet in Atlanta

This is a report of the discussion meeting held by the Georgia textile operating executives at the Ansley Hotel, Atlanta, Ga., on Tuesday, September 18th. It was a good meeting, judging its merits by the attendance, the manner in which the men participated, and the facts and opinions brought out in the discussion itself. It was evident that with each succeeding meeting of this kind for the discussion of mill subjects, the fellows are overcoming an original tendency toward reserve and reticence, and are putting themselves into the discussion in great shape.

The subjects discussed at this meeting were slashing, weaving, twisting, finishing and the cloth room—the major part of the discussion being devoted to the departments of slashing and weaving. A report of this discussion, practically complete, will be found in the following paragraphs.

At a meeting of the executive committee held prior to the discussion sessions, Carl P. Thompson, superintendent of The Trion Company, Trion, Ga., was elected to the position of general chairman for the ensuing year, and George W. Hamilton, superintendent, Crown Cotton Mills, Dalton, Ga., was selected to succeed Mr. Thompson as vice general chairman. Charles A. Sweet, superintendent of the Fairfax Mill, West Point, Ga., was elected as a member of the executive committee to succeed G. A. Franklin, of Augusta, whose term expired with this session, and Robert W. Philip, associate editor of Cotton, was appointed as secretary-treasurer for the coming year.

The Morning Discussion on Slashing.

Discussion on slashing occupied the entire morning session, which was called to order by General Chairman R. W. Jennings, after which Mr. Thompson made the invocation. Mr. Jennings then spoke briefly, urging whole-hearted participation in the discussion, and pointing out also the value of a wider acquaintance among the operating executives. He also cordially welcomed visiting operating executives from other states who were present, declaring that the Georgia men wanted these visitors to feel at home and take part in the discussion, and assuring them that they will always be welcome at any discussion meetings of the organization.

George W. Hamilton, as chairman of the committee in charge of the meeting, ably conducted the discussion, which was based on the questionnaire previously submitted to the members. (This questionnaire was published on page 939 of the August issue of Cotton.)

The first question discussed was "What percentage of size is best for good running weaving?"

"I think that depends on the number of yarn that you are spinning, and the construction of the goods that you are weaving," said John F. Long, superintendent of the Lois Cotton Mills, at Douglasville, in making the first response. "We spin 30s warp, and make 68x72, 64x60, 66x44, and other goods, and our average per cent of size will be around eight per cent. I had a mill superintendent tell me to put in ten per cent, but he could not tell me why. I think that our percentage is best for good running work."

Mr. Hamilton at this point read a reply to this question which had been received from a mill man: "I should say from 5 to 20 per cent. It all depends, however, on the number of the yarn, the twist in the yarn, the number of threads per inch in the reed, the picks per inch, whether plain weave, one up and one down, or plain weave with two threads in one harness eye with four threads in one dent of reed; also whether it is three-harness drill or twills or sateen weave; and whether the yarn is dyed. There are also many other litt'e points to be considered."

"I would like to ask the men who talk about putting in 15 per cent if they don't think this is loading the cloth," requested G. A. Franklin, superintendent of the Sibley Mfg. Company, Augusta. "It strikes me that anywhere from seven to ten per cent would be best for good running weaving, and I would just like to hear if anybody puts over that for good running work, or whether they do it to load the cloth."

"I believe our percentage runs near around twelve per cent," said Mr. Thompson, of Trion, "on light sheetings and drills, with about a 23s yarn. To answer Mr. Franklin's question, I suspect that we are loading a mite, but our weaver, Mr. Pennington, who is here, will bear me out in the statement that with a certain amount of coating on the yarn we aid the weaving, probably make the yarn a little stronger, when we give it enough 'lubricant.' I believe we have found that that percentage on our numbers gives us better running work."

General Chairman R. W. Jennings.

"If you put in fifteen or twenty per cent would you be loading it, or do it for good running work?" asked Mr. Franklin. "We would be loading it," replied Mr. Thompson. "We have put in as high as sixteen per cent, but we did it just to see how far we could go. For your information I will say that we weigh all of our yarn before it goes to the slashers, and after it leaves the slasher; every beam

is weighed, so that on every set that we put through we know what percentage of size goes on it and what the variation is."

C. R. Brown, superintendent, The American Textile Company, Atco, Georgia, asked, "How do you know what the percentage is?" By weighing, Mr. Thompson answered, and Mr. Brown then asked how he knew whether he was weighing starch or water. "If we are weighing an excessive amount of water we get mildew," said Mr. Thompson. "How do you know it's excessive?" asked Mr. Brown. "I don't know what you mean," continued Mr. Thompson, "but we try not to dry the yarn too bone-dry, but leave it in an ordinary condition." He continued that he had had some analyzed and that his figures were borne out as being approximately correct.

"Do you use anything else besides starch as a weighing agent?" asked A. E. Massey, superintendent of the Thomaston (Ga.) Cotton Mills. "No, sir," replied Mr. Thompson.

Charles A. Sweet, of Fairfax Mill was the next speaker. "I would like to ask if anyone knows whether the breaking strength of the yarn increases in sizing after a definite percentage of size is applied, whether it is seven, or eight, or twelve per cent," he suggested. "Is there some point at which the breaking strength is not increased? The object of sizing is not only to reduce chafing but also to increase breaking strength. Has anyone found out whether, after a certain definite percentage, the breaking strength increases, or does it decrease after a certain amount of weighting? I have no information on this, and am asking for information."

"I made some tests on that," responded Mr. Franklin, "and went from six to fifteen per cent, by putting a bobbin behind and weighing and breaking it as it came through. We found that up to eight per cent we increased the breaking strength, and that above eight per cent we could not see any increase."

"Do you remember the proportionate increase?" asked Mr. Sweet. "No," replied Mr. Franklin. "I remember that from seven to nine per cent we got the strongest yarn."

"We have found with eight per cent on yarn ranging from 9s to 14s—coarse numbers—that we get an increased breaking strength of from thirteen to fourteen per cent," said Mr. Sweet.

W. L. Stephens, overseer weaving, Lois Cotton Mills, Douglasville, asked the gentleman from Trion what weight squeeze roll he used in putting on the amount of size referred to. T. H. Pennington, overseer weaving, The Trion Company, replied that his squeeze rolls weigh from 350 to 400 pounds. A. R. Gossett, overseer of weaving, Sibley Mfg. Company, Augusta, said that his weigh 350 pounds, but that he adds levers with weights and forces the size in the yarn to give a better penetration, so that he does not know the exact weight being put on. R. M. Matthews, superintendent, Peerless Cotton Mills, Thomaston, said his squeeze roll weight is 500 pounds but that this is on a 100-inch slasher.

A show of hands by those present using less than five per cent size was suggested by W. R. McElveen, overseer weaving, Peerless Cotton Mills, Thomaston. The majority present use more than five per cent, it was indicated.

Frank E. Heymer, superintendent, Bradley Mfg. Company, Columbus, Ga., related an experience in percentages of size at this point. "I have had some experience where we put in as high as fourteen per cent," he said. "I have found about fourteen per cent good, and I increased the production in my mill—a small mill—from 26,000 pounds to 34,000 pounds, and finally got up to 44,000 pounds, and I attribute it entirely to good yarn and sizing. We put the weight into it because we were making a fabric where we could. It runs just as well or better; of course I had to make the yarn a little softer so the size would go in, and used a twist below standard, but it certainly worked fine for me."

"I think that question can hardly be answered with any definite figures," was the opinion of L. L. Jones, secretary and superintendent, Canton Cotton Mills. "The percentage of size for good running work might vary with the same yarn. This brother here spoke of using a soft yarn and high percentage; he confirmed my own experience. We can put on a light size and have a little less softener in it and the work will run well; I can put on more size and more softener and the work will run just as well. I am on one weight, but our experience has been just that: whenever we put in more size, in order to make the weaving run right we must give it a little more softener. It depends on the goods, the twist, and also on your humidity. If you go ahead and weight your goods and put on a small amount of size and then have a good heavy humidity, the warps will 'ball up' and you have got to increase that, and if you get too much size and then have a low humidity they will break on you, so it depends on your humidity just as much as on the size; and it depends on the softener and the amounts." Replying to a question from Mr. Franklin, who makes the same type of work, Mr. Jones replied that he puts in around ten per cent. Mr. Franklin asked if he thought that was best for good running work, and Mr. Jones replied that "I can get just as good running work by putting in twelve per cent."

A gentleman stated that his cloth is bleached after it is woven, and that he puts in just enough size to cause the weaving to run good. He said he uses about eight per cent.

C. R. Brumby, Jr., superintendent, Cedartown Cotton & Export Company, asked for further elucidation upon Mr. Heymer's statement that he increased his production by putting in size.

"When I took charge of the mill," responded Mr. Heymer, "we thought it wonderful to get 26,000 pounds production. I figured, however, that the mill was capable of 44,000 pounds. I had a young fellow as spinner, and I explained to him how I thought we could get it, and we discussed the matter and he said I was a fool. I got another spinner and explained my plans to him, and three days later he came in and said, 'Yes, sir, we can get it.' We experimented for nearly one year to get the right twist for the particular goods we were making, and we finally succeeded. On 7s we went up to 14 per cent in sizing, and that gave us the right weight and the best running work on our looms. We used to cut the warps out, but about this time we put in steel heddles and that increased the production, and then, by reducing the twist in the spinning, that increased the production in the spinning room, and the natural consequence was that we got a better mill-production. On 12s yarn we increased the size from five or six to eight and ten per cent and had better running work than at the former percentage. (This also applied to the 7s.) All of these aided us so that the third year our produc-

tion went to 44,000 pounds, and I attribute it to the better running work."

W. O. Tallent, superintendent, Adams Cotton Mills, Macon, asked what class of goods Mr. Heymer referred to, and the answer was "single filling, flat duck."

Hal Riviere, assistant superintendent, Eagle & Phenix Mills, Columbus, who in the vote taken several minutes previously had indicated he was using less than five per cent of size, was requested to make a statement. He explained their practice by saying that they were almost entirely on colored work, so that a great deal of their cloth had to be de-sized before dyeing. He added that on some colored work they could not put in a large amount because it would cause the yarn to buckle up on top of the cloth and cause unevenness. He indicated that on regular white work more size could be applied to advantage.

At this point the second question in the questionnaire was presented by Mr. Hamilton: "What percentage of increased strength in yarn can be gained by using ball bearings on the slasher cylinder? Is the positive driven slasher better than the ball bearing for strength of yarn?"

J. A. Sorrells, superintendent, Gainesville Cotton Mills, had indicated in replying to the question that he had gained approximately ten per cent in increased yarn strength by the use of ball bearings, and this was read. Mr. Franklin asked what type of bearings had been used previously, and Mr. Sorrells said that formerly plain bearings had been used there. Mr. Jones asked if the slasher was positive-driven or driven by friction. "Positive," replied Mr. Sorrells. "I had the friction, but put on positive drive. Got better breaking strength and better running in the weaving." He said he has one slasher that is friction-driven and that the work does not run so good on it as on the positive-driven machine. He added that the ball bearings were on the machines before the change in manner of drive was made.

On some of his work, said Mr. Franklin, "it doesn't make a particle of difference how you run it, for you do not stretch a heavy sheet. Now on the lighter sheets we find that the positive-driven slasher is better; we increased the breaking strength about five per cent. But on the heavier sheets I don't believe it matters."

W. W. Arnold, Jr., superintendent, Manchester Cotton Mills, said, "I think it depends entirely on the number of ends," and expressed the same opinion as Mr. Franklin.

The next question discussed was: "Is thin boiling starch better than thick boiling starch? Why?"

Everyone responding to the questionnaire by mail, with one exception, indicated a preference for thin boiling starch because of claims for better penetration, less shedding, smoother woven goods, better weight, etc.; and the concensus of opinion at the meeting seemed to be in favor of thin boiling starch. The one exception—Mr. Thompson, of Trion—who indicated that he uses thick boiling starch, was called upon for a statement.

"From what I have heard about the two starches and their use," said Mr. Thompson, "I believe that our experience has been different to that of the most of you. We have tried thin boiling starch, and I do not believe that we have gotten the results with it that we get from the thick boiling starch. We feel from the running of the work and the percentage of size we put on, the amount of shedding at the loom, that we get better results from a thick boiling starch." A member asked Mr. Thompson what kind of goods he runs and he replied that he makes light sheetings and drills.

"We are using from 20 to 75 fluidity," said Mr. Matthews, of Thomaston. "We can tell very little difference in the 'feel' between using 60 and 75, and we get about the same results with 40 as we do with 80. However, we like the 'feel' and the running of the work that we get with the thin boiling starch; it doesn't hang to the outside." He said that his construction is 68x72. William W. Arnold, Jr., said that he has tried both, and that on his work—sateens—he gets better results with the thin boiling starch. This same opinion was expressed by Mr. Long, of Douglasville.

"My experience is the same as Mr. Thompson's," said Mr. Heymer. "I was persuaded by one of the starch manufacturers' representatives to use a thin boiling starch 'because everybody else was doing it.' I wanted, as always, to have the best of everything, so I tried it, and I lost about 4,000 to 6,000 pounds production the week I had my weave room full of the warps sized with the thin boiling starch. I threw it out and went back to thick boiling starch and my production increased back to what I had been making. It simply depends on the grade of goods that you are making; thin boiling starch may answer for some fabrics while on others it will not answer. For flat duck I think thick boiling starch is best."

"How long should starch be cooked before using, and at what temperature?" was next asked by Mr. Hamilton.

"Two hours," replied Mr. Sorrells.

"One hour," said Mr. Heymer, "with a preparation of twenty minutes before you put anything in there. I stir it up, and pour it in and add other ingredients to it and turn the steam on and work gradually up to a boiling temperature."

"Doesn't it take twenty minutes to get it hot after you start, Mr. Heymer?" was asked by Mr. Jones.

"Twenty minutes we run it in cold water, then turn on the steam slowly, and then after it gets to a boiling temperature it boils for one hour, which makes it about an hour and forty minutes before we use it," continued Mr. Heymer.

John D. Loner, superintendent, Dwight Mfg. Company, Alabama City, Ala., said in part: "If I understand this meeting, we are all just one big family, and in the same game, and our business here is to discuss things together and to exchange our practical views on things. At the Dwight mill, for years we have made our size and cooked it under pressure. For a number of years our agent would not permit us to let anybody know about it—starch men and size men and everybody else were never permitted to see that operation. After a while we discovered that we didn't have such a secret as we thought, and we began to let the fact be known that we boiled our size under pressure. In actual laboratory tests between thin and regular pearl starch—I'll state it practical, that way—tests taken from the size cooked under pressure of thirty pounds, cooked about three hours from the time the steam is turned on, taking a certain period to get it up to a certain degree, which is 260 degrees F., and then boiling it for forty or fifty minutes at 260 degrees F. and then shutting off the steam—we find that we only get the results from that, that the fellow gets with the thin boiling starch cooked about 45 minutes in the open kettle. We made that test taking thin boiling starch in the same kettle with the same amount

of water, the same amount of starch, and cooking it with the kettle open without pressure and then running it through, and then cooking it one hour in the ordinary way, and we got the same results as cooking thin boiling starch as indicated. I might add that we figured on a saving of 80 cents per hundred pounds of starch, which in our case amounts to quite a little sum of money. I will not say that cooking starch under pressure is better than the thin boiling starch, but I will say that it is just as good."

With reference to the amount of size, Mr. Loner continued, "I would say that for good weaving, 10½ per cent is all right; and I don't care what you weave, because we find on sheetings that 10½ per cent is best and we make quite a few drills and twills. We tried putting in 12 per cent on some of them and we had some complaint from manufacturers on the shoe linings having too much starch; I think they should not be more than 12 per cent."

Mr. Brown, of Ateo, asked for a system of checking up on the man who mixes the size in order to know that he puts in the prescribed number of gallons or pounds of each ingredient.

Mr. Franklin said that to overcome as far as possible the chance of error in this regard, he took three drawing cans and cut them off, and then when making up a batch of size he has these receptacles placed on the scales and gets the weight exactly.

Mr. Sorrells suggested making a box that will hold just so much as is desired.

The next question propounded by Chairman Hamilton was, "Is an open weave light wool blanket better than a close weave heavy wool blanket?"

In answering this, Mr. Pennington, of Trion, said, "My experience in sizing 22s and 23s yarn is that an open weave 16-ounce is best; I find we always get better results from that than from a heavier, closer woven goods. I change slasher cloth every time I change a set of yarn; I change one on one set and then one on the next, and pull back and re-cover twice a day. I do not run one slasher cloth over six hours without changing, and I keep a good cushion on the squeeze roll, in order that I may not flatten my yarn. I put the cloth in cold water and keep it soaked out well."

Mr. Jones said that he had tried both kinds and that he gets "pretty much the same results by varying the size formula. You can put in the same amount of starch or size with both," he said, "and you will have to vary the formula to do it."

"When you change to a heavier blanket, how do you change the formula? In other words, suppose you are running a thin blanket and change to a heavier blanket, in which way would you change the formula?" asked Mr. Franklin. Mr. Jones did not answer this question definitely but indicated that he would use a thin starch mixture.

"Should slashers be run at high speed with additional steam pressure for drying yarn, or slow speed with low steam pressure to obtain the best percentage for added weight?" was Mr. Hamilton's next question.

High-speeded slashers was the recommendation and practice of S. W. Engram, overseer weaving, Monroe Cotton Mills. Asked why he prefers this, Mr. Engram said that "I get it off the slashers quicker." Mr. Franklin asked whether he would not get a better penetration if his slashers were run at a slower speed, and Mr. Engram replied that he didn't think he would. "I think you get penetration by the way your size is made up," he said. "The faster you can run a slasher and get the yarn off the better."

W. L. Phillips, superintendent, Social Sircle Cotton Mills Company, said that "We have had a lot of trouble along this line. Our production is 30,000 pounds, and we had one slasher, and we had to run that slasher just like lightning, and we had a great deal of trouble with the last two cuts on the beam breaking weaker. We had to run the pressure up so that we baked the yarn. We had to cut down the speed of the slasher and run it day and night rather than run it too fast. We had been carrying 15 pounds and cut it down to 10 pounds."

"I've had a regular old 'Nancy Hanks' down in our slasher room; but last week we started up another slasher, and I surely can tell the difference in our weaving; it runs 30 to 40 per cent better," said W. H. Epps, superintendent, The Jefferson Mills.

Mr. Hamilton next asked a question regarding the temperature of the storage tank and size box. J. J. Hyder, overseer weaving, Lanett Cotton Mills, said that he keeps 200 degrees in the storage tank. Mr. Gossett, of Sibley, said, "We keep our temperature in the size box and storage tank at 175 degrees. If we keep it hotter in the size box it will jump out." Another man said he boils his just as hard as he can, and is well over 212 degrees. Mr. Engram stated that he has a control on his size box and keeps the temperature at 190, and has no trouble with size boiling out. Mr. Long recommended a temperature of 170 to 185.

Reverting to Mr. Gossett's difficulty of size jumping out, Mr. Arnold asked whether he has the closed or open coil in the size box, and the reply was that it is the latter. Another man asked whether the orifices in the coil were positioned so that the steam entered the box in a straight stream upward or at an angle. Mr. Gossett advised that it was the former.

Chairman Hamilton asked if anyone used a closed coil for heating the size in the size box. Mr. Phillips said he uses one in the reserve (storage) kettle. He says he runs this at 20 pounds pressure.

Mr. Hamilton next brought up the question of size congealing in the storage tank or kettles, and asked for experiences as to what the men do for this when it occurs. He called on J. W. Hames, superintendent, Exposition Cotton Mills, about it, and Mr. Hames replied that he had never had any experience, but that if he did have size to congeal, he guessed he would "throw it in the ditch." One man said he had the trouble with closed coils, but that it would not occur with open coils as the force of the steam coming out of the orifices keeps the size blown away from the coils. He added that his experience showed that the size would congeal only around the pipe with the closed coil.

Some certain compounds will cause the size to congeal, it was brought out by Mr. Riviere, of Columbus. He said he had had that experience. Mr. Hames asked whether he was able to save or reclaim the size so congealing, and Mr. Riviere replied that they did save it, but it resulted in the making of practically new size.

"Do you run a lease roller between the size box and the first cylinder? What do you think of it?" next asked Chairman Hamilton. Mr. Arnold said that they do and that he thinks it is a very good thing, as it helps to spread the yarn. He said his roll revolves. Mr. Gossett said that it helps a great deal on heavy sheets of medium-number yarn. Another member said that he had had a great deal of

difficulty with yarn breaking out behind the lease rods, and put this roll in between the size box and the first cylinder, and thus eliminated the trouble.

An overseer asked if anyone had tried this on a double-head slasher; and if so, with what results. Another man said he had done this with very good results. He said that with the plied-selvage warp he runs the roller the way the selvage runs.

Mr. Hyder said that more benefit could be derived from this practice on the double-head slasher than with the single-head slasher.

One man said he tried this roller on fine numbers—30s and 40s—and found that the roll got gummed up and tends to break the yarn on the bottom sheet of yarn when the roll turned with the upper sheet. "Unless the slasher tender is a close observer the yarn will wind around the roller and break pretty badly," he said.

Chairman Hamilton read the following comment from a mailed answer to the question: "From experience, I was convinced long ago that the sheet of yarn should not be disturbed in any manner whatever after coming from the size rolls until it reaches the rods in front. I have found that by placing the beams differently from the usual manner I get the result desired with the roll mentioned in the question. As I understand it, this roller is for the purpose of making the two halves split easier at the front."

The next question was, "What is a conservative number of yards to be left on a warper beam when the slasher runs out? What is a conservative percentage of hard waste made on a slasher?"

Mr. Franklin first discussed this question. "I have heard some say that they could get this down to three or four yards on the warper beam. Ours averages nearer 25 yards. I want you fellows to tell me how you do it."

Mr. Sorrells said that he has his down to ½ to ¾ of a pound on a warper beam. (Mr. Sorrells makes an average of about 30s yarn.)

"I have made some tests for the last few days and I think that we are getting from eight to twelve yards to the beam," responded Mr. Pennington. "It depends a good deal about how the yarn starts on the warper beams. If a warper tender is particular it looks like eight to twelve yards is a reasonable allowance. I think it might be lower in some cases. On our goods I think eight to twelve yards is pretty good. We run from 1,500 to 2,400 to 3,000 ends to the set—from four to nine beams—18,000-yard beams." Mr. Arnold said that on sateens, 5,000 ends, he got nine pounds of soft waste. He said that in one particular instance he got it down to one yard but that was a rare exception and that usually it ran considerably higher than that.

Mr. Franklin related an experience of a test on ball warpers and found a variation of fourteen yards between the warps in a set of fifteen warps. He said he had tried a number of recommendations, among them the changing of the position of his measuring device on the warper, and that "it didn't make a durn bit of difference."

"I'll comfort you by saying we have it as bad as you," said Mr. Riviere. "I think that the way the yarn runs when the tension roll comes down and raises has a tendency for the yarn to slip and that will make a difference in the different beams." He said that every now and then they change a warper from a ball warper to a beam warper and observe a considerable difference there. The clocks are different and the notches register a different number of yards.

Mr. Stephens said he believed that quite a bit of the waste left on warper beams behind the slasher was due to uneven friction or tension on the slasher itself. He stated that he always has more waste on the back beam than on any other, and that he attributes this to the fact that the yarn from this beam runs over and under the other beams and tends to increase the friction on that particular beam. He said he had tried running the beams all on the same level, and that this tended to reduce the amount of waste because the yarn does not go over and under the other beams. "I believe if you could run the beams with each going over a separate roller that the beams would run out much more evenly," he concluded.

The system outlined by Mr. Stephens had a strong advocate in Mr. Pennington. "In January of this year," said the gentleman from Trion, "I went into our slasher room and told the man I was going to make some changes, and either help something or tear up something. I went to work and got a 3 x 5 timber for each slasher creel, and put every beam on the same level, with all of them turning the same way, and then put a small, two-pound weight on each beam head, the beams all pulling over the top. I run all my slashers that way with from four to nine beams and I get mighty good results."

Another point brought out by Mr. Pennington was that different sized beams may be the cause of some variation and waste.

As a suggestion to Mr. Franklin, who makes goods similar to his own and dyes, Mr. Jones suggested that he have the same tension on the warps in the dyehouse. He also pointed out that he had gotten good results by having one beamer run one set; that is, not mixing the sets. He pointed out that while different beamers might use different weights, the chances are that one beamer would use very nearly the same all the time.

One man said that once he ran one set of warps off the same warper in the one set on the slasher, "and I had a variation right along with the rest of them."

Remedies for slack threads on the beams behind slashers were next asked for by Chairman Hamilton.

Mr. Thompson said, "If you run all the beams over the top, pulling over the same way, you will not be bothered with it."

"We had some 60-inch warpers and we had slack ends about eight inches from the selvage, and then they would twist up and after sizing they would break out," said Mr. Franklin. He stated that he began asking around for suggestions to remedy this, and got all kinds of recommendations, and none of them did much good. However, he continued, an old man working for him went to another mill one day and came back and said run the beams backward, that is, over toward the warper. "We tried that and have used it ever since, and we haven't had a slack end since we did."

Mr. McElveen, of Thomaston, said he thought Mr. Franklin was right, and that he had done it, up until taking his present position, where they have wide warpers that cannot be run in this manner without slippage.

A member said he had trouble with beams jumping and asked for suggestions. Mr. Franklin told him that "Peter

Quinn says to cut grooves through the cylinder about three inches apart and they will not do that."

At this point Mr. Thompson, of Trion, substantiated Mr. Pennington's statement with reference to running the creel in the slasher with the warps on the same level.

The proper weight of squeeze roll to use was next brought up by Mr. Hamilton, and inasmuch as this had been previously discussed it was decided to eliminate this discussion. However, one member asked the question as to whether in using a heavier squeeze roll it is necessary to use a heavier covering. "I had a 350-pound roll," he said, "and I put a weight on the lever to make it heavier, and I found I had to use a great deal more covering than I had been using. I got a better penetration in the warp, and I did not know whether it was because of the greater covering or the increased weight." Mr. Heymer stated that "I think you could use a heavier covering on the heavier roll if you want to get a cushion."

The next question was: Which will give the best results, to agitate the starch and compound in cold water before turning on the steam, or to turn on the steam as soon as the starch and compound are put into the kettle?

Mr. Heymer repeated the practice which he had explained previously in the meeting, and by a show of hands it was brought out that most of the men who were present agitate the starch before turning on the steam. Mr. Jones asked Mr. Heymer, "Do you get any other results by that, or does it only dissolve the softener?" Mr. Heymer replied that he does not put the softener in until the steam in turned on. "We put in the size and starch and agitate and we get a better mixture by agitating before we turn the steam on," added Mr. Franklin. Mr. Heymer said that he agitates from 15 to 20 minutes before turning on the steam—agitating in cold water.

Remedies for rust spots on slashers were next asked for by the chairman. Mr. McElveen, of Thomaston, recommended the use of copper kettles to accomplish this. W. W. Arnold, Jr., stated that he built a wooden hood to catch the vapor from the size box, and that this did considerable toward eliminating rust spots. In response to questions, he indicated that this wood is cypress and does not rot, and that he is not particularly bothered with dirty drippings from the condensed vapor on the inside of the wooden hood.

"I had that same experience," said Mr. Phillips, of Social Circle. "We had a metal hood, and I built a cypress hood and a cypress size box. We also did away with the fan."

Mr. Sweet said he had once had considerable trouble with rust spots, and made all kinds of investigations without effecting a remedy. Finally, he said, they found that the pipe running from the storage tank to the size vat, which was iron, was flaking off into the size. He said they substituted a brass pipe and got rid of the trouble.

The next question discussed was the comparative merits of using separate traps for each slasher or having all slashers run into one trap. Mr. Hamilton was the only one who indicated that he pipes all the slashers into one trap, and explained as his reason a desire to save on the amount of steam used and consequently effect a saving on his coal bill. Mr. Riviere, also discussing this question, stated that his slashers are located on the fifth floor, and that on the third floor he has a central trap into which all slashers discharge, but later indicated that he also has an individual trap for each slasher.

In the discussion on this question, Capt. E. Lang stated that when he was superintendent of the Lanett Cotton Mills, he installed a quarter-inch brass pipe on the boxes and ran this up into a tank next to the size kettle, the pressure from the cylinder being just enough to drive the water out into this reserve tank. Then, he said, he utilized this water, which was thus thoroughly distilled, in his size mixing, and that he had never had greater success. "I am surprised to find that very few mill men have brought up the question of using distilled water in making size," said Captain Lang.

The advantage of recording thermometers in sizing was next discussed by Mr. Phillips, Mr. Hamilton, Mr. Heymer, Mr. Hames, Mr. Jones, and others. They all declared that they considered recording instruments a great advantage; they are "silent watchmen" that are very dependable.

At this point Mr. Franklin announced the meeting to be held by the Southern Textile Association in Augusta on October 12 and 13, reading the proposed menu for a barbecue to be staged on this occasion, and urged a good attendance on the part of the Georgia men.

Following Mr. Franklin's announcement, the meeting went into an executive session to elect a member of the executive committee to succeed Mr. Franklin. Charles A. Sweet, of Fairfax Mill, was unanimously elected to this position. He will serve for a period of two and one-half years.

"Dutch" Luncheon.

In accordance with established custom, the meeting adjourned at 12:30 and the men repaired to tables where a "Dutch" luncheon was served. During the luncheon, interesting talks were made by R. J. Davidson, of Atlanta, who spoke on the need for educating and protecting operatives, and W. M. McLaurine, executive secretary of the Cotton Manufacturers' Association of Georgia, who pointed out to the operating executives how they can assist in connection with compensation insurance in the mills.

The Afternoon Discussion.

Discussion was resumed at the afternoon session, which closely followed the luncheon. Weaving, twisting, cloth room and finishing subjects were taken up, and G. A. Franklin assisted Mr. Hamilton in the conduct of the meeting.

Weaving was first considered, and Mr. Franklin read the question, "In weaving hose and belting duck, which do you think better, a tight or a slack weave?" He reported that the unanimous opinion expressed in the answers received to the questionnaire was that a tight weave was far superior, and no verbal discussion of this question was held.

"Do you know of anything in weaving that will increase breaking strength?" was the next question.

D. G. Reid, superintendent, International Cotton Mills, Hogansville, Ga., when called upon for a statement regarding this, said: "Our experience has been that when we run the cloth slack and then tighten up on it, it will help and we get five to fifteen pounds better breaking strength. Of course we have to put more ends in the warp, but it will give you better breaking strength."

"I think he is right," said Mr. Jones.

"Well, that's a new wrinkle on me," said Mr. Franklin. "I always thought that when you did that you weakened

it, although you fellows may be right. It is something I am glad to know, and I am going to experiment with it. I don't see why it wouldn't work on other goods, too."

Mr. Franklin next read another reply to this question which stated that to move the whip roll to the last notch will tend to increase breaking strength during weaving. He then stated that the concensus of the replies received to the questionnaire seemed to be that the use of the proper humidity and size will aid in increasing the breaking strength.

Methods of paying weavers were next discussed—and opinions asked as to whether the yard, pound, or pick method is best. Mr. Hyder, of Lanett, says that he prefers paying by the pick. Mr. Reid had indicated in his reply that "all are very good, but I prefer to pay by the yard." He was asked to explain his preference and said that "in a duck mill, where you make a variety of goods, the yard method is the best. If you are running on one grade of goods, paying by the pick is best, but in a duck mill making fifty different styles or maybe more, it would take three or four Philadelphia lawyers to pay by the pick."

"When you pay by the yard," asked Mr. Franklin, "on the different constructions do you pay different prices?" "Yes sir," replied Mr. Reid, "but a difference of a pick or a pick and a half wouldn't alter the price." He added that the price is changed for each change of two picks or more.

Mr. Engram, of Monroe, gave it as his opinion that paying by the pound is best. "If you pay by the pound," he continued, "the weaver will watch the work more closely; he knows that when he picks out he is reducing his pay. We have a method whereby when we change the pick or the width we change the price; the speed of the loom, the number of picks, width of goods and weight are all considered. Every time we change the width two inches we change the price."

"Suppose a mill is running night and day," suggested Mr. Franklin, "wouldn't paying by the pick be better?" Mr. Engram didn't think so, saying that when he changes weavers he marks the cut, and as he knows what the cloth weighs, he figures his weavers' pay by that on the pound basis.

Mr. Sweet, of Fairfax Mill, spoke in favor of pick counters. "We have been paying by the pound, running day and night," he said, "but recently we put on pick counters. Our idea in doing this was three-fold: First, we can get an accurate check of the production of the looms and find out which weavers are actually getting production; second, there is no incentive on the part of the weaver to step on the sand roll gear and make bad cloth which you must catch later on; and third, there is a psychological effect in the weaver's looking at the pick counters as he is walking down his alley. He can see the production of yesterday and today and get the comparative production on his various looms. We believe that paying by the pick is going to prove very much more satisfactory than our old method of pound-paying."

"I have had experience in paying by the pound and by the yard," said S. A. Moak, overseer weaving, Anchor Duck Mills, Rome, "but after trying out the pick counters, I like the method of paying by the pick much better. I hope that I will be able some time to run everything by the pick. I find that where we have the pick counters, the weavers watch them and take an interest in them and know what they are doing. I like the pick counters."

Mr. Sweet at this point added that there is no question about the paying for the cloth when the pick counter is used; there is no argument at all.

A man asked, "With pick counters, can they run the loom while the cloth is off?" "It is entirely *possible* to run the loom with the warp out—if you let them do it," responded Mr. Sweet.

The next question was, "Do you think it a good rule to make a standard for loom fixers to work by when setting and adjusting looms?"

Oscar D. Grimes, superintendent, Milstead Mfg. Company, made the first response to this question. "In our mill," said Mr. Grimes, "in making a variety of heavily picked goods, it is necessary to have a standard, because if we do not we will have a different face on the same construction of goods. We have to adjust all the looms the same to keep the face of the goods the same. This standard, of course, applies only to goods of similar construction, as different constructions require different settings, but for the same style of goods we do have a standard."

Mr. Jones added that it is absolutely necessary to do this on certain goods. A representative from Eagle & Phenix Mills stated that they run 25 or more different fabrics, and that even on the same construction on certain goods they decided it was best not to have a standard, but to eliminate defects on a particular grade of goods by adjusting the individual looms.

A still different practice was explained by Mr. Pennington, of Trion. "When it comes to adjusting the looms to face certain grades of goods," he said, "I do not have any required method of setting the looms more than in particular kinds of goods and this rule applies only to the setting of the whip roll and take-up roll. The other adjustments I leave pretty well to the fixer. But when it comes to adjusting the whip rolls and the take-up rolls, on each style of goods, I go myself or the second hand or head loomfixer, and we make a setting on a loom to suit a certain class of work that will properly face that goods, and then these settings are carried out pretty well to a rule. Outside of that we do not have any particular setting."

Mr. Franklin reported that most of the men responding to the questionnaire by mail have a standard by which to set for the different grades of goods. He next asked the question, "Is a high sand roll better to eliminate reedy cloth? What advantage is to be had by running a high whip roll?"

James Newsom, manager and superintendent, Unity Cotton Mills, LaGrange, expressed the opinion that the sand roll does not cause or prevent reedy cloth on heavy duck. Mr. Franklin asked, "Do you regulate by the whip roll?" and Mr. Grimes, of Milstead, replied:

"On our class of goods, reedy cloth is generally caused from too open a reed; if it is too reedy we run two ends to the dent. Raising the whip roll does help to cover up the pinholes in the cloth."

Another duck man stated that "on heavy duck we regulate that by the breast beam or whip roll. The sand roll doesn't have anything to do with it; either lowering or raising the whip roll or breast beam will prevent reedy cloth."

E. R. Lehman, assistant superintendent, The Dixie Cot-

ton Mills, LaGrange, added that "on our grade of goods it does take out the reedy effect. I think that a high sand roll hurts the strength on our class of work, but it does help the reedy effect."

"I wouldn't think that a high sand roll would have anything to do with reedy cloth," said Mr. Moak. "But to raise the breast beam and whip roll will partially affect reedy cloth, and another thing is setting the lay as far back as possible from the fell of the cloth."

Mr. Lehman at this point added that a high whip roll does put a smooth effect on the cloth and eliminates the tendency to have reedy cloth.

At this point Mr. Riviere pointed out that on the Draper loom the sand roll acts as the breast beam, while on other looms the sand roll is below the breast beam and is stationary. Mr. Grimes stated that in his remarks he referred to the Crompton & Knowles loom on which the sand roll is not adjustable.

Mr. Stephens, of Douglasville, declared that there are some cases where the customer requires a face on the bottom of the cloth equal to that on the top; he pointed out that this effect could not be secured simply by lowering or raising the whip roll. He further declared that another cause contributing to reedy effects is a tight harness, and also that the kind of stop motion used has something to do with it, to indicate that "reedy effects are not overcome altogether by raising or lowering the whip roll."

"On an old E model Draper loom," said Mr. Pennington, "the breast beam is stationary, and there is no way of adjusting it; the adjustment being made by the take-up roll or sand roll. On these looms I run that take-up roll just as low as the breast beam will allow the bolt to go down. Now on Draper looms installed in 1905 to 1908, I run that just a little higher than that because there is more space in the breast beam so you can go down lower or up higher."

Mr. Hyder declared that with the single bank stop motion on the Draper loom, raising the sand roll or whip roll should be done to affect the cover of the cloth; but "since we have the three-bank stop motion it is not necessary to raise the sand roll or whip roll as the three-bank stop motion itself helps to overcome the reedy effect in the cloth."

"What causes most of your seconds?" was the next question asked. "Inexperienced weavers cause most of mine," said one man. "Ours are caused by a lot of different things," responded Mr. Grimes. "Poor help, and inexperienced hands in the other parts of the mill as well as in the weave room."

Mr. Moak indicated that his seconds are caused in part by incompetent help in the weave room.

"By Gad!" ejaculated Mr. Edwards, of Rome, "I've been spinning for Mr. Moak for fifteen years and that's the first time I've ever heard him say bad work was caused anywhere else besides the spinning room. Im glad to have him say that."

Mr. Jones declared that the chance of causing seconds at the slasher is very great; "you can ruin it quicker at the slasher than you can anywhere else," he said. He added that big knots on the yarn causes him more trouble than anything else, and he wished he could get these through without excessive size on them.

Break-outs and knots were the cause given by Mr. Newsom for most of his seconds, adding that he runs plied yarn. Mr. Grimes at this point explained that in all duck mills the percentage of seconds is very low; that it runs usually about ½ of 1 per cent.

"Mine are caused by incompetent help, starting in the card room and going all the way through," declared Mr. Thompson. "We are fighting it all the time and trying to train our help to eliminate bad work."

Systems for weavers taking cloth off at cut marks were asked for by Mr. Franklin. "We put from one to six cuts on a beam, and use the cut mark, and the weaver is supposed to split the cut mark," said Mr. Grimes. Clifford Barnes, overseer weaving, Exposition Cotton Mills, Atlanta, said they run a great variety of goods, and mark every two cuts. Mr. Heymer said he had used the single cut mark and had experienced difficulty, but that he now has the double cut mark system with very satisfactory results.

Mr. Gillespie said that several years ago he made a rule requiring the weaver to get the overseer or second hand to mark a piece of cloth if it became necessary to take it off before the cut mark came around.

Mr. Matthews, of Thomaston, was called upon for a statement. He said that they do not use the cut mark on the slashers, but doff the looms on day work once a week and the looms on night work twice a week. A yard hand goes to the loom with a measuring stick, and if the cut woven is less than 40 yards it remains on the loom until the next doffing day. Mr. Franklin asked how he paid the day and night weavers, and Mr. Matthews explained that each weaver has a number, the day weavers have odd numbers and the night weavers even numbers, and the goods are measured when perched, the poundage figured and each weaver paid accordingly. The hand who does the measuring does not know to whom any number belongs, he said.

At this point a gentleman from Eagle & Phenix Mills asked for a suggestion for a cut mark for black warps that would be satisfactory, but no answers were made to this question. Mr. Phillips said that he uses the system explained by Mr. Matthews, doffing the cloth once a week provided it is over a single cut, and paying by the pound. "I get better production than by using the cut mark," he said.

Mr. Franklin read the next question: What system have you for taking care of double threads?—that is, where two threads are tied to one in the tying-in machine. Mr. Underwood, of Shawmut, stated that he takes care of them by letting them run idle around the warp. Mr. McElveen said that the best system is stopping them at the slasher; that is, taking a lease on the slasher every time you have three or four threads out, and not letting them get to the weave room. In case they should get out into the weaving, he said, the only thing is to run them around the beam. "Some folks run them over into the selvage," he added, "but where you have a standard selvage you cannot do that."

Mr. Franklin said his run around the whip roll. L. H. Rice, of the Manchester Cotton Mills, said they have the man at the tying-in machine look out for them; and if one or two should get into the loom, "we run them out in the selvage."

"What is considered minimum feeler waste per loom per week, 55 hours running time, 14s filling?" asked Mr. Franklin as the next question to be discussed. He replied to this by saying that "I have some old straight feelers that will stop shuttle marks all right, but they will make a bunch of waste. And then we have some sliding feelers and

bunch builders on another machine. I made some experiments in answer to this question, and with the sliding feeler and bunch builder I got seven ounces a week to the loom (14s filling); then I re-wound the filling and got four ounces a week. But on the straight feeler I got 16 ounces a week—and most of mine is like that, I'm frank to say."

The next question was for the duck men.—"What is the best method of reducing bow in hose and belting duck?"

Mr. Grimes explained that the meaning of the word "bow" in the question was the curve in the filling; "that is, from selvage to selvage. It doesn't mean a crooked piece of goods. On some looms there is an iron piece on the breast beam with the selvages projecting further to the front of the loom than in the center; on others there is a straight piece of iron. Some mills secure this curve by the use of a piece of wood which has been taken to the carpenter shop and concaved. In our mill, on hose and belting duck, we have put a metal strip on the breast beam which is adjustable."

The next question also applied especially to ducks. It was, "What is the best method of maintaining uniform widths and crimps during changing weather conditions, with ordinary systems of humidification?"

Mr. Grimes, of Milstead, said that "the only answer I can give to that is to keep the width on the loom uniform. I have no answer because I have that variation myself."

"On duck the only think we can do is to have the weaver keep that regulated," added Mr. Moak. "We have a gauge and have the weaver keep the width of the cloth regulated accordingly."

Mr. Underwood, of Shawmut, declared that with the automatically regulated humidification, changing weather conditions should not affect the width or crimp. He pointed out that care was necessary, though, in keeping the humidifiers in the correct condition.

This started a discussion regarding automatic control of humidity. Mr. Grimes stated that he has automatic control on part of his system, and that he regulates for from seven to ten per cent regain. However, "at times the outside atmospheric conditions will be such that the humidifiers will not supply sufficient moisture to maintain eight per cent, and at other times the outside conditions will be so damp that the regain will be more than eight per cent. Then, when you cannot control these conditions in the mill, what do you do to maintain uniform widths and crimps?"

Mr. Reid said he didn't believe "that it is possible to eliminate this trouble."

If a mill has sufficient heads in the weave room it will help, said Mr. McElveen. He said where he had used four or six heads formerly the results were to his satisfaction, but that on his present job he has two humidifiers in a big weave room which will not give the results desired.

Mr. Hames expressed it as his opinion that the big difficulty with automatic control is that in extremely dry weather, "we do not have enough humidifiers.

"We have the automatic system at Lanett," said Mr. Hyder, "but we have a special humidifier man who understands them, and they work satisfactorily; the usual trouble is that the mill doesn't have someone to properly look after them."

The next question asked was for the best way to set a loom on a twill to get a good smooth bottom and also get a good face with a prominent twill. Mr. Barnes, of Exposition, recommended for this purpose a high sand roll, also a high whip roll with vibrating cam straight up and with reed one-quarter inch from the fell of the cloth.

Mr. Gossett's suggestion was: Let down the whip roll and take-up roll as near on a line with the lay as possible. Set the cams with two harnesses level and let the reed stand three inches from the fell of the cloth.

Mr. Franklin next asked: "What reasons can you give for variation of picks on a piece of cloth woven in the same loom and under the same conditions?"

"Faulty let-off," said Mr. Grimes.

"Has anyone had that experience with a worm take-up?" asked Mr. Barnes. Mr. Hamilton replied in the affirmative and said that it is usually caused from the let-off not letting off properly. "I think improperly set harness will cause this trouble," said Mr. Underwood, "and one harness will jerk harder than another."

The next question was: "What would you consider the best way of timing the harness on a heavy pick fabric, either heavy sheeting or sateen, to prevent the cloth from bagging in the center?"

Mr. Barnes' suggestion was "the higher you can get the whip roll and sand roll, and the sooner you time your harness, the less bagging you will have." He recommended setting the harness cams 2¾ inches from the fell of the cloth.

T. F. Lockridge, overseer weaving, Crown Cotton Mills, Dalton, said, "work the harness back as far as possible and raise the whip roll."

The old, old question of running the filling with the traverse going down fast and up slow, or up fast and down slow was next discussed. Mr. Riviere said he uses it both ways and never has any complaint from the weaver. Mr. Lehman, of LaGrange, brought out that "if you make the filling stroke long enough to stop sloughed filling from coming off, it is satisfactory either way. One mighty important thing, said Mr. Edwards, of Rome, is a longer stroke, and long taper on the filling, "but that will not eliminate it if there is a dwell on the upper change of the traverse." It was pointed out that "generally the weaver wants the traverse to go up slow but that he can run it satisfactorily either way if he gets the dwell off at the top change, with a reasonably long taper."

"Have any of you paid particular attention to the speed of the traverse?" asked Mr. Grimes. "That would make a big difference," agreed Mr. Franklin, "for with a slow speed traverse when it changes it dwells longer at that point."

"Running the stroke up fast and down slow will make less 'sloughing,'" said Mr. Phillips. "It gives less trouble in the spinning room and less trouble in the weave room, and you can get more yarn on the bobbin, which means less changing of shuttles."

"The spinners say it puts more strain on the yarn to run it down fast," said Mr. Franklin. Mr. Long suggested having the Pittman roller mounted on ball bearings, kept in good shape, and properly oiled at all times.

Discussion on Twisting.

Twisting was taken up at this point, and the first question was: What is the best method of avoiding making corkscrew yarn on twisters when twisting more than 5-ply?

Mr. Grimes said: "Make a uniform yarn and then get a uniform tension on the spools in the creel, with a roller

heavy enough to keep the tension uniform. This will avoid the trouble to a certain extent."

Mr. Edwards, of Rome, brought out that corkscrew yarn on twisters is frequently caused by having five rows of spools and having one small spool on top dragging over the larger spools.

As a remedy for corkscrew yarn, Mr. Reid said, "see that you get good yarn from spinning, and keep the twister creel spindles tight, so you will get a good even pull on the yarn."

The discussion chairman next asked, "What is the largest ring that 2, 3 and 4-ply coarse yarn can be successfully run on, yarn to be run with standard twist?" Mr. Grimes said that "I had a machinery builder tell me that he had seen 16/2 yarn run on a five-inch ring—I think that answers the question." Mr. Riviére asked, "Do you get production?" "No, you don't get production," replied Mr. Grimes, "but it was not the economical side of it, but the satisfactory feature that was being considered, as I understood the man who told me about it.'

"Which do you consider best for these ply yarns," was next asked, "flange ring with steel traveler, or vertical ring with bronze traveler? Which would you consider best on vertical rings, steel or bronze traveler?" Mr. Franklin replied to this question as follows: Flange ring with steel travelers for dry twist; vertical rings, bronze travelers for wet twist."

"On dry twist I prefer the vertical ring with the bronze traveler, because the steel traveler is harder to get on the ring," said Mr. Grimes.

"Do you think a steel traveler will cut a ring quicker than bronze?" asked Mr. Reid. "Yes," was Mr. Hamilton's reply, who indicated his preference for dry twist is a flange ring with steel traveler.

C. S. Fagan, foreman of spinning, Standard-Coosa-Thatcher Company, Piedmont, Alabama, asked whether anyone had made any tests as to the comparative life of rings in using steel and bronze travelers. He said, "I have been told that the steel traveler will always wear out the ring quicker, but I have never had anybody show me. I am making some tests on it at this time."

The next question listed was: Can a five-inch ring twister be run at a faster speed with individual motor than with belt drive? Mr. Franklin asked why this could be possible. Mr. Newsom stated that it could be done because of a steadier pull with the individual motor.

The final question in twisting was: What is the difference in the life of a waxed band and a band that is not waxed? Is there any difference in per cent of slippage of the two bands?

"I use waxed bands on spinning and find them very satisfactory," said Mr. Edwards. "They partially eliminate slippage, and I suppose there would be some difference in the life of the band because the wax would protect the band from moisture."

"We have not found any difference in the life of the band or in the twist of the yarn on the twister between a band that is waxed and one that is not," stated Mr. Grimes, of Milstead.

John D. MacAuley, foreman of spinning, Standard-Coosa-Thatcher Company, asked whether the bands were waxed before or after applying to the machine. "Afterwards," replied Mr. Grimes. Mr. Long, of Douglasville, said he gets good results with a waxed band, waxed with a piece of beeswax after being tied on.

Cloth Room Discussion.

Two questions on cloth room work were presented—"How close to the face and underside of cloth should the card and emery rolls on a brusher be set to obtain the best results?" and "What material should be used in covering drums on sewing rolling machines?"

These two questions were discussed by J. E. Thompson, overseer cloth room, Exposition Cotton Mills, a representative of the Unity Cotton Mills, Edgar W. Mitchell, cloth room overseer, Lanett Cotton Mills and others. They were practically agreed in the opinion that the emery rolls should be set about ⅛ of an inch from the cloth, and the card rollers should be set at varying distances, depending upon the amount of brushing required. With regard to the covering of the drums on sewing rolling machines, Mr. Thompson stated that he uses a No. 2 sand cloth. Frank E. Heymer said he tried perforated tin with good results, and, on a 3.50-yard goods has found a band, similar to a twister band, wound spirally around the roll, to give excellent results. Mr. Mitchell brought out that Curtis & Marble Machine Company furnishes a tape that is spirally wound around the roller, "and it is a very good cover."

The final questions brought up related to dyeing, bnt no discussion resulted, and Mr. Franklin read the replies of one superintendent which had been sent in by mail. The questions and this man's replies follows:

"What is the best method of saturation for yarn bleaching? What solution should be used in this?"

"Place the yarn in the kier," said the reply, "and boil either with or without pressure, using a three per cent caustic solution, percentage being figured on the weight of the goods. This solution being circulated through the goods. Boil for six to eight hours."

The next question: "What is the best method of saturation for cloth bleaching? What solution should be used in this?" The reply stated: "Run the goods through a solution of malt to de-size them, after which they are left lying in a pile for several hours, then washed and given a caustic boil the same as yarn."

The third question was, "What preparatory saturation should be used for yarn dyeing? What solution should be used in this?"

The answer said, "Boil in clear water, water with soap or alkali or soluble oil, according to the work being done." Mr. Franklin's reply to this question was, "We dye indigo and boil out with a one and one-half per cent solution of soda ash at 160 degrees F. Then wash with cold water."

The final question was, "What preparatory saturation should be used for cloth dyeing? What solution should be used on this?"

The answer stated, "De-size as in preparation for bleaching and boil out with alkali." Another reply said, "Cloth to be run through a solution of diastafor or malt extract to remove all starch and after lying several hours be given a thorough wash in warm water."

This concluded the discussion, and the meeting was adjourned. It was stated that announcement of the next meeting will be made as soon as the date is definitely settled.

Those who think they can't are always right.

The Boston Textile Show

"See you in Boston Textile Week!"

This is a common phrase now being passed among men engaged in all branches of the textile industry, and a record-breaking attendance is expected for the Eighth International Textile Exposition, to be held at the Mechanics Building, Boston, during the week of October 29 to November 3.

Indications received from the textile centers throughout the country are to the effect that a great interest is being shown in the coming show, and, General Manager Campbell says, everything points to a general exodus to the Bay State, a migration of such magnitude that there will be many vacant chairs in the offices of the leading textile concerns of the country.

The Boston Show represents pre-eminence in textile expositions in this country. This year's show will be the eighth one to be conducted, and, as in the past, Chester I. Campbell will have the affair under his direct supervision —which, to the regular exhibitor, means that everything will be staged to the greatest satisfaction and convenience possible. In the arrangement of exhibits, display and lighting effects and decorations, this year's show is expected to eclipse all previous effort in this direction. The experience of past expositions is always used as the basis for the next one, and especial endeavor will be made to present a still better, more interesting and instructive exposition this year.

The appended list of exhibitors indicates that, as in the past, the exposition will include a wide variety of products in its displays; and the Boston show has a particular appeal in that it enables the busy mill executive to grasp in a short time the numerous improvements and developments that have taken place in the machinery and equipment. He can get in contact with the machinery manufacturer and discuss subjects of mutual interest.

A good representation from the southern section is anticipated for this show.

In connection with the exposition there will be two national conventions which will attract a large number of visitors. The main meeting will be the convention of the National Association of Cotton Manufacturers, which will be held at the Copley-Plaza Hotel on Wednesday, October 31, and Thursday, November 1. Secretary Harry C. Meserve is arranging a special program for this semi-annual meeting, which will be presided over by President Robert Amory. This convention is expected to attract men not only from the United States but from Canada and England as well.

The New England Association of Commercial Engineers will also meet during the textile show. Their convention will attract textile men also, inasmuch as this body of technical experts devote their time to the promotion of power appliances, and in connection with the textile exhibits, the usual power show will be held throughout the week in the basement of Mechanics' Building. In this division of the show will be displayed much of importance to the industry in the application and transmission of power.

The officers of the Textile Exhibitors' Association, which conduct the International Textile Exposition, are President, Edgar F. Hathaway; vice-president, Frank J. Hale; secretary-treasurer, Chester I. Campbell; directors: E. F. Hathaway, L. E. Tracy, C. A. Chase, F. J. Hale, F. H. Bishop, G. P. Erhard, L. M. Keeler, W. I. Stimpson, F. W. Howe, S. F. Rockwell and Chester I. Campbell.

A partial alphabetical list of those who have engaged space for this year's show follows:

Adams, J. C. & Co., 120 Boylston St., Boston.
Ainslie Knitting Machine Co., 738 Grand St., Brooklyn, N. Y.
Alabama Power Company, Brown Marx Bldg., Birmingham, Ala.
Aldrich Machine Works, Greenwood, S. C.
Allbestos Corporation, Philadelphia, Pa.
Alsatian Machine Works, Ltd., 152 Congress St., Boston.
American Abrasive Metals Co., 50 Church St., New York City.
American Arch Co., Inc., 17 E. 42nd St., New York, N. Y.
American Kron Scale Co., 10 High St., Boston.
American Moistening Co., 251 Causeway St., Boston.
American Pulley Company, The, 165 Pearl St., Boston.
American Scrubbing Equip't Co., 1225 Collier St., Hannibal, Mo.
American Steam Gauge & Valve Mfg. Co., Box 128, Boston, Mass.
American Tool & Machine Co., 10 High St., Boston.
American Wool & Cotton Reporter, 530 Atlantic Ave., Boston.

CHESTER I. CAMPBELL, GENERAL MANAGER.

American Wringer Co., Woonsocket, R. I.
Arabol Mfg. Co., 110 E. 42nd St., New York City.
Armour Soap Works, 1355 W. 31st St., Chicago, Ill.
Armstrong Machine Works, Three Rivers, Mich.
Ashton Valve Co., The, 161 First St., Cambridge.
Ashworth Bros., Inc., Fall River, Mass.
Atkinson Haserick & Co., 152 Congress St., Boston.
Atlas Plywood Corporation, 10 High St., Boston.
Atteaux, F. E. & Co., Inc., 176 Purchase St., Boston.
Bahnson Co., The, 437 Fifth Ave., New York, N. Y.
Barber Colman Co., Rockford, Ill.
Beach Soap Company, Lawrence and Maple St., Lawrence.
Bellamy Mill Wright & Machine Co., 127 Purchase St., Boston
Blackstone Valley Comb Wks., 77 Forrest St., New Bedford, Mass.
Blocker Gregory Co., 248 Roysalton St., Boston.
Borne-Scrymser Co., 36 Central Wharf, Boston.
Bradley Washfountain Co., Milwaukee, Wis.
Bragdon Lord & Nagle Co., 111 Summer St., Boston.
Braman Dow & Co., 239 Causeway St., Boston.
Brinckerhoff H. Gordan Co., 10 High St., Boston.
Bristol Company, 514 Old South Bldg., Boston.
Brock, Edward P. & Co., 231 Congress St., Boston.
Brown, L. C. & G. W., 49 Federal St., Boston.
Bunday Steam Trap Company, 39 Elm St., Manchester, N. H.
Butterworth, H. W. & Sons Co., Philadelphia, Pa.
Canadian Textile Journal, Gardenvale, Quebec, Canada.
Carbic Mfg. Co., 27 School St., Boston.
Carrier Engineering Corp., 176 Federal St., Boston.
Cashin, W. D. & Co., 35 Hartford St., Boston.
Celite Products Company, 79 Milk St., Boston.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Cochrane Steam Specialty Co. of Mass., 141 Milk St., Boston.
Coppus Engineering Corp., 344 Park Ave., Worcester, Mass.
Corbett, W. F., 219 N. Broad St., Philadelphia, Pa.
Couch, L. A., 100 Pearl St., Boston.
Courtney, The Dana S. Co., Chicopee, Mass.
Crane Packing Co., 1800 Cuyler Ave., Chicago.

Cresson Morris Co., 18th St. & Allegheny Ave., Philadelphia.
Crew Levick Company, 2nd & Monroe Sts., E. Cambridge.
Curley, Edward E., 234 Essex St., Lawrence.
Curtis & Marble Machine Co., Worcester, Mass.
Davis & Furber Machine Co., North Andover, Mass.
Davis, Frank, Mfg. Co., 426 Main St., Pawtucket, R. I.
Dearborn Chemical Co., 299 Broadway, N. Y.
d'Este Julian Company, 26 Canal St., Boston.
Dodge Mfg. Co., 137 Purchase St., Boston.
du Pont De Nemours, E. I. & Co., Wilmington, Delaware.
Eagle Oil & Supply Co., 45 India St., Boston.
Eckstein, Albert, & Co., 31 E. 28th St., N. Y. City.
Eclipse Textile Devices, Inc., Elmira, N. Y.
Economy Fuse Mfg. Co., 10 High St., Boston.
Economy Lubricating Co., 6 Temple St., Charlestown, Mass.
Edison Storage Battery Co., Orange, N. J.
Elec. Storage Battery Co., The, Allegheny Ave. & 19th St., Phila.
Elk Fire Brick Co., 50 Congress St., Boston.
Elliot & Hall, Worcester, Mass.
Ellison, Lewis M., 214 West Kinzie St., Chicago, Ill.
Elwell Parker Electric Co., 49 Federal St., Boston.
Fafnir Bearing Co., New Britain, Conn.
Fairbanks, Morse & Co., 245 State St., Boston.
Fairchild Advertising, Inc., 52 Cnauncey St., Boston.
Fellows Gear Shaper Co., The, Springfield, Vt.
Fibre & Fabric, 475 Main St., Cambridge.
Field, William H., Co., 39 Washington St., North Boston.
Fiske Brothers Refining Co., 24 State St., New York.
Flexible Steel Lacing Co., 4607 Lexington St., Chicago, Ill.
Forbes Lithograph Mfg. Co., P. O. Box 5130, Boston.
Ford, The J. B. Co., Wyandotte, Mich.
Fournier & Lemoine, Linwood, Mass.
Foster Machine Co., Westfield, Mass.
Foxboro Co., Inc., The, 49 Federal St., Boston.
Gallaudet Aircraft Corp., East Greenwich, R. I.
Garlock Packing Co., 88 Broad St., Boston.
General Electric Company, 84 State St., Boston.
Georgia Railway & Power Co., Atlanta, Ga.
Gibby Engineering Company, 96 Condor St., E. Boston.
Graton & Knight, Worcester, Mass.
Greene Tweed & Co., 109 Duane St., New York, N. Y.
Grinnell Company, Providence, R. I.
Haire Publishing Co., 170 Broadway, New York, N. Y.
Harnett Lubricating Co., 100 Boylston St., Boston.
Harris, A. W., Oil Co., 326 S. Water St., Providence, R. I.
Hetherington, John & Sons, Ltd., 10 High St., Boston.
Hayes Pump & Machinery Co., 94 Pearl St., Boston.
Hopedale Mfg. Co., Milford, Mass.
Howard Bros. Mfg. Co., 44 Vine St., Worcester, Mass.
Howes Publishing Co., 4109 Woolworth Bldg., New York City.
Hurricane Engineering Co. of Mass., 53 State St., Boston.
Hussong Dyeing Machine Co., Groveville, N. J.
Hyatt Roller Bearing Co., 709 Sixth Ave., New York, N. Y.
International Cotton Mills, 453 Washington St., Boston.
International Engineering Wks., Inc., Box B, Framingham, Mass.
International Nickel Co., 67 Wall St., N. Y. C.
International Salt Co., Inc., Scranton, Pa.
Ipswich Mills, 453 Washington St., Boston.
Jenkins Bros., 524 Atlantic Ave., Boston.
Johns Manville, Inc., of Mass., 55 High St., Boston.
Johnson & Bassett, Worcester, Mass.
Johnson Oliver & Co., Inc., 18 Custom House St., Providence.
Kaumagraph Co., 209 W. 38th St., New York City.
Keystone Lubricating Co., 88 Broad St., Boston.
Keystone Refractories Company, 120 Liberty St., New York.
King Refractories Co., Inc., 220 Devonshire St., Boston.
Klauder Weldon Dyeing Machine Co., Bethayres, Pa.
Klipstein, A. & Co., 283 Congress St., Boston.
Knott, L. S., Apparatus Co., 79 Amherst St., Cambridge, Mass.
Kwix Company, 106 Friend St., Boston.
La Lo Chemical Co., Inc., Bay & Friendship Sts., Providence.
Lane, W. T., & Brothers, Poughkeepsie, N. J.
Lawrence & Co., 453 Washington St., Boston.
Lawrence, A. C., Leather Co., 161 South St., Boston.
Lazenby, F. A., & Co., 414 Key Highway, Baltimore, Md.
Lead Lined Iron Pipe Co., Broadway, Wakefield, Mass.
Leyland Thomas & Co., Readville, Mass.
Link Belt Co., Nicetown, Philadelphia, Pa.
Locke Regulator Co., 76 North St., Salem, Mass.
Lowell Chamber of Commerce, Lowell, Mass.
Macomb Machine Co., 52 Chauncey St., Boston.
Macrodi Fibre Company, Woonsocket, R. I.
Manning Maxwell & Moore, Inc., 99 Chauncey St., Boston.
Manufacturers Record, Baltimore, Md.
Mason Regulator Company, 1190 Adams St., Dorchester, Mass.
Masury Young Company, 60 Roland St., Charleston, Mass.
McLeod & Henry Co., 357 First St., Troy, N. Y.
Mercury Mfg. Co., Chicago, Ill.
Merrimack Mfg. Co., 453 Washington St., Boston.
Meyers, Mr. Jacob, 6321 20th Ave., Brooklyn, N. Y.
Monarch Soot Remover Co., Inc., Norfolk Downs, Mass.
Montello, V., 68 Spring St., Medford, Mass.
Morris & Co., Inc., Groveville, N. J.
Morse Chain Co., Ithaca, N. Y.
Mossberg Frank Co., Lamb St., Attleboro, Mass.
Mossberg Pressed Steel Corp., West St., Attleboro, Mass.
Nash Engineering Co., South Norwalk, Conn.
National Aniline & Chemical Co., Inc., 40 Rector St., N. Y.
National Association of Cotton Mfrs., 45 Milk St., Boston.
National Engineer, 417 Dearborn St., Chicago, Ill.
National Pipe Bending Co., 117 Lloyd St., New Haven, Conn.
National Shawmut Bank of Boston, Boston, Mass.
Nelson Valve Co., 131 State St., Boston.
New Bedford Textile School, New Bedford, Mass.
New England Spun Silk Corp., 342 Weston Ave., Brighton.
New York & New Jersey Lubricant Co., 401 Broadway, N. Y. C.
Norma Co. of America, Ansble Ave., Long Island City, N. Y.
Oakley Chemical Co., 22 Thames St., New York, N. Y.
Oxweld Acetylene Co., 646 Frelinghuysen Ave., Newark, N. J.
Pacific Mills, 453 Washington St., Boston.
Pairpoint Corp., New Bedford, Mass.
Parks & Woolson Machine Co., Springfield, Vt.
Parks Cramer Company, Fitchburg, Mass.
Patterson Lubricating Co., 11 Storer St., Boston.
Payne, F. S., Co., 75 Richdale Ave., Cambridge.
Peabody Engineering Corp., 141 Milk St., Boston.
Perfection Grate & Supply Co., 164 Birnie Ave., Springfield, Mass.
Perkins, B. F., & Son, Inc., Holyoke, Mass.
Perkins, P. L., Co., 261 Franklin St., Boston.
Permutit Co., The, 440 Fourth Ave., New York, N. Y.
Philadelphia Drying Machinery Co., Philadelphia, Pa.
Philadelphia Grease Mfg. Co., The, 848 So. Swanson St., Phila.
Power Equipment Co., 131 State St., Boston.
Power Plant Engineering, 537 So. Dearborn St., Chicago.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Quigley Furnace Specialties Co., 20 Cortlandt St., New York.
Racine Tool & Machine Co., 1439 Junction Ave., Racine, Mich.
Raymond, Charles P., Agency, Inc., 294 Washington St., Boston.
Reading Steel Casting Co., Inc., P. O. Box 1002, Bridgeport, Conn.
Reeves Pulley Co., 99 Chauncey St., Boston.
Rhode Island Warp Stop Equipment Co., 248 Pine St., Pawtucket.
Robinson, John R., 110 West 34th St., New York City.
Root Co., The, Bristol, Conn.
Ruggles Klingemann Mfg. Co., 200 Devonshire St., Boston.
S K F Industries, Inc., 711 Little Bldg., Boston.
Sarco Company, Inc., 233 Broadway, New York City.
Saurer, Adolph, Inc., 651 River Ave., & E. 151st St., New York.
Schaeffer & Budenberg Mfg. Co., Box 128, Boston.
Schumaker Santry Co., 141 Milk St., Boston.
Scott Henry & Co., P. O. Box, 963, Providence, R. I.
Scott & Williams, Inc., 366 Broadway, New York City.
Seiters William & Co., Inc., Philadelphia, Pa.
Seydel Chemical Co., 120 Broadway, New York City.
Shambow Shuttle Co., Winter St., Woonsocket, R. I.
Shawmut Engineering Co., 179 Freeport St., Boston.
Sherwin Williams Co., The, Canal Road, Cleveland, Ohio.
Shumway, Franklin P., Co., 453 Washington St., Boston.
Signode System, Inc., 136 Pearl St., Boston.
Silk Publishing Co., 1123 Broadway, New York.
Sirrine, J. E., & Co., Greenville, S. C.
Smith Publishing Co., Grant Bldg., Atlanta, Ga.
Southern Textile Bulletin, Charlotte, N. C.
Southern Textile Machinery Co., Paducah, Ky.
Stack Heater Company, 39 Sudbury St., Boston.
Stafford Company, The, Readville, Mass.
Starkweather & Broadhurst, Inc., 79 Milk St., Boston.
Steel Heddle Mfg. Co., 2100 W. Allegheny Ave., Philadelphia.
Stevens, George E., Co., 180 Milk St., Boston.
Stewart Sayres Co., 50 Church St., New York City.
Stowe & Woodward Co., Oak St., Newton Upper Falls, Mass.
Superheater Co., The, E. 42nd St., New York City.
Suter, Mr. Alfred, 200 Fifth Ave., New York City.
Tabulating Machine Co., The, 170 Summer St., Boston.
Tagliabue, C. J., Mfg. Co., 18 Thirty-third St., Brooklyn, N. Y.
Talcott, W. O. & M. W., Inc., 91 Sabin St., Providence, R. I.
Taylor Instrument Companies, Rochester, N. Y.
Tension Co., L. V. B., 545 Pleasant St., New Bedford, Mass.
Texas Company, The, 201 Devonshire St., Boston.
Textile American, The, Old South Bldg., Boston.
Textile Digest, The, Real Estate Trust Bldg., Philadelphia, Pa.
Textile-Finishing Machinery Co., The, 83 Ex. Pl., Providence.
Tidewater Oil Sales Corp., 11 Broadway, New York City.
Tolhurst Machine Co., Troy, N. Y.
Tracy Co., Lewis E., 127 Broad St., Boston.
Transmission Ball Bearings Co., 1050 Military Rd., Buffalo, N. Y.
U. S. Air Compressor Co., 316 Columbus Ave., Boston.
U. S. Gutta Perchia Paint Co., Providence, R. I.
Universal Winding Co, 95 South St., Boston.
Valve Engineering Company, 66 Hamilton St., Cambridge.
Van Noorden & Co., E., 100 Magazine St., Boston.
Veeder Mfg. Co., Hartford, Conn.
Wadsworth Howland & Co., Inc., 139 Federal St., Boston.
Waite & Davey Co., Inc., 9 Jackson Ave., Long Island City, N. Y.
Walworth Mfg. Co., 800 E. First St., So. Boston.
Ward's, Edgar T., Sons Co., 44 Farnsworth St., Boston.
Wardell Braiding Machine Co., Central Falls, R. I.
Westinghouse Elec. & Mfg. Co., 10 High St., Boston.
Westinghouse Lamp Co., 165 Broadway, New York.
Wheeler Condenser & Engineering Co., 141 Milk St., Boston.
Whitinsville Spinning Ring Co., Whitinsville, Mass.
Whittenton Mfg. Co., 453 Washington St., Boston.
Williams, The D. T., Valve Co., Cincinnati, Ohio.
Williams, The J. H., Co., Millbury, Mass.
Wing & Evans, Inc., 89 State St., Boston.
Woods, S. A., Machine Co., Boston.
Woonsocket Napping Machinery Co., Woonsocket, R. I.
Zinsser & Co., Hastings on Hudson, N. Y.

"Elastic and Non-Elastic Narrow Fabrics," by Samuel Brown. 75 pages. Bragdon, Lord & Nagle Co., 334 Fourth Avenue, New York City, publishers. Price $3.00 per copy.

This volume, recently published, contains eleven chapters in which the subject is covered in a comprehensive manner, the author dealing with the technical end of manufacturing the fabrics under consideration, and discussing the various types of machinery for this use, together with a description of the different operations involved, and the methods of setting, adjusting, etc. Also contained in the book is an article by William Davis, M. A., on "Knitted Narrow Fabrics."

M. F. MASSAGEE has become overseer of spinning at the American Cotton Mills, Bessemer, N. C. He formerly held a similar position at the Gray Mills, Gastonia, N. C.

E. A. MEYERS has become overseer of the cloth room at the Osage Mfg. Co., Bessemer City, N. C.

W. R. EASTREDGE has become overseer of spinning at the Osage Mills, Bessemer City, N. C.

Correction of Yarn Tensiles with a Varying Moisture Content

BY H. H. HARPER.

All fibers, whether of vegetable or animal origin, are endowed with the property of hygroscopicity—that is, the power of absorbing water from the air—and undergo alterations in weight and volume corresponding to the amount of moisture so taken up. In damp air they expand and become heavy, and in dry air contract and lose weight, the cause of the phenomenom being due to the variable temperature of the atmosphere. According to the origin of the fiber, the quantity of moisture absorbed and retained is larger or smaller. By reason of this peculiarity, unsurmountable difficulties would attend commercial dealing in textile fibers, especially cotton fibers, were no means of determining and taking into account the percentages of moisture they contain.

The maximal admissible percentages of moisture for cotton fibers, and the normal amounts therein in the air dry condition, were experimentally ascertained some sixty years ago. But it was not until recently that any account had been taken of the moisture content in yarn and cloths, although, as shown in the accompanying table, the amount of water fixed by the cotton fibers is important.

Table of Water Content of the Cotton Fiber in an Air-Dry Condition and After Exposure for Some Time in an Atmosphere Saturated With Moisture.

Water Content in Air Dry Condition	5.50%
Maximum Percentage Absorbed	20.80%
Regain	8.30%
Direct Loss	7.10%

The term "regain" means that if 100 parts of cotton in an absolutely dry state were exposed to the atmosphere under normal conditions, it would regain as many parts of moisture as is indicated in the table.

The term "direct loss" means that if 100 parts of cotton are in a correct condition and absolutely dried, it would lose as many parts of moisture as is indicated in the table.

In order to obtain figures on yarn and fabric tensiles or breaking strengths which show true comparisons it is necessary that they contain the same amount of moisture. Yarn and cloth, as it is manufactured in the average mill, varies in its moisture content from 3 to 8 per cent. Then, when testing yarn and fabrics from time to time, it is essential to know exactly the amount of moisture therein.

To say that 8s yarn breaks 238 pounds to one skein of 120 yards means comparatively little unless we know the amount of moisture the yarn contains. If a sample of 8s yarn contains 8 per cent moisture, naturally its tensile would be greater than the same yarn with a 3 per cent moisture content. Consequently, a fabric containing 3 per cent moisture will have a lower breaking weight than the same fabric with 8 per cent moisture. Therefore, there is no reasonable comparison unless all samples for testing contain the same amount of moisture. But it is a hard proposition conditioning samples to contain the same amount of moisture, and to get around this, the correction method has been provided.

In the more modern mills, equipped with electrical moisture testing ovens, self-recording hygrometers, automatic temperature regulators, automatic moisture regulating humidifiers, etc., the samples of yarn or cloth to be tested are conditioned in an atmosphere of 65 per cent relative humidity at 70 degrees F. (dry bulb) for four hours, which is equivalent to breaking a sample of yarn containing 7.1 per cent moisture. But as such equipment is quite expensive and but few mills are so equipped, the following method has been determined and results therefrom check very closely with the method just described.

Samples of yarn are taken and broken on the tensile machine, regardless of the moisture content, and then weighed. Next, the samples are placed in a drying oven and dried at a temperature of 220 degrees F. for two hours, or until the samples are bone dry. Then, after the samples are bone dry, this weight is taken, the difference between this weight and the original weight of the sample before drying is the amount of moisture the sample did contain. This difference in weight is then reduced to per cent by figuring against the original weight. It has been found and proven as a correction factor on all coarse yarns, 1s to 30s, that for each per cent of moisture above 7.1 per cent it is necessary to deduct 7 per cent of the total break. For each per cent below 7.1 per cent, add 7 per cent to the total break.

For example, suppose a skein of 10s yarn has a tensile of 190 pounds and it has been found that the yarn contains 8 per cent moisture, the correction is as follows:

$$8\% - 7.1\% = .9\%$$
$$.9\% \times 7\% = 6.3\%$$
$$190 \text{ lbs.} \times 93.7\ (100\% - 6.3\%) = 178 \text{ lbs.},$$

Another illustration: suppose a skein of 20s yarn has a breaking strength of 98 pounds with 5.5 per cent moisture. The correction is:

$$7.1\% - 5.5\% = 1.6\%$$
$$7\% \times 1.6\% = 11.2\%$$
$$98 \text{ lbs.} \times 111.2\%\ (100 + 11.2) = 108.97 \text{ lbs.}$$

Exhaustive tests have been made to determine the accuracy of this method of correction for yarns numbering 1s to 30s and it has been found to be very close. Therefore, the advantages and usefulness of this formula are inestimable, especially because of its necessarily frequent use in testing all yarns. Tables have been made up, using 7.1 per cent as a standard moisture content, just as the yarn numbering scale was prepared by using 840 yards as the standard length of one pound of 1s yarn.

The American Society for Testing Materials have been using a method similar to this for correcting the breaking weights on duck tensiles, but no such method has ever been arranged before on yarn tensiles.

New literature illustrating the Grundy patent flexible insulated coupling and the Mather flexible coupling has recently been issued by Charles Bond Company, 617 Arch Street, Philadelphia, in a pamphlet known as "Booklet F," copies of which may be secured upon request. Special specification data relating to these products and other appropriate information is included in the publication.

What the Southern Mills Are Doing

From a comparative point of view, conditions in the southern textile field during the past month were better than those existing during the previous month. Vacation times were fading away, and everything seemed tightening up for a good run during the fall and winter.

A continuance of new construction and improvement was noticed, together with further progress on projects already promoted and announced. A number of mills changed hands, as far as the controlling interest was concerned; and there were rumors of further developments of this nature to occur within the month to come. Another rumor that seemed to assume the aspect of definite action was to the effect that a large finishing concern of the East will construct a great southern branch in Western North Carolina. At the time of this writing no official announcement has been made, but it is known that options on land, retained for quite a while, have been taken up and doubtless announcement to the effect that construction work will soon start will have been made by the time this issue is in the hands of the reader.

A negotiation which represented probably one of the largest sales of southern cotton mill properties within recent years was consummated in September when Lockwood, Greene & Company, Inc., procured the large bulk of the textile mill holdings of Colonel Leroy W. Springs, of Lancaster, S. C. The mills involved in the transaction were the Eureka Cotton Mills and Springstein Mills, at Chester, S. C.; the Fort Mill Manufacturing Company, at Fort Mill, S. C., and the Lancaster Cotton Mills at Lancaster, S. C. The combined spindleage of the plants acquired by Lockwood, Greene & Company in this transaction totals more than 250,000 spindles, and the deal is of added interest in view of the previous recent purchase by this company of the Pelzer (S. C.) Manufacturing Company and the Tucapau (S. C.) Mills.

In Georgia, progress work continued at the southern branch plant of the United States Finishing Company at Cedartown, Ga., Robert & Company, the engineers in charge of the work, having let the construction contract for the erection of the building.

The Toccoa (Ga.) Mills were recently purchased by the Hartwell (Ga.) Mills, of which John H. Cheatham, of Griffin, is president and treasurer. The Toccoa plant will be known as Hartwell Cotton Mills No. 2, and it is not thought that any immediate extensive improvements will be made, as approximately $50,000 was recently invested in development work shortly before the change of ownership. It is stated that the consideration involved in the deal was $250,000. The mill has 9,152 spindles and 256 looms.

The American Thread Company of Georgia has been organized with a capital of $2,000,000, to construct a mill at Dalton, Ga., which will contain either 30,000 or 40,000 spindles, and which is the first unit of a projected development in that vicinity to ultimately total about 120,000 spindles. This is a branch of the American Thread Company of New York.

The company has secured 500 acres of land at Dalton, which includes a three-acre lake that will be developed into a community center. Immediate construction work will begin on 150 houses for operatives. It is rumored that finishing processes will be included in the equipment to be installed; the property contains a million-gallon spring which might be adapted for this purpose. Lockwood, Greene & Co. are engineers for the construction and development work.

The Delburg-Linden Mills, Davidson, N. C., have been purchased by Martin L. Cannon and associates, and the new owners assumed physical charge on October 1. It is understood that plans are under way for improvement and development some time in the future.

The Queen Anne Textile Company, Burlington, N. C., has been incorporated with a capital stock of $1,000,000. The officers are: W. H. Morton, Adams, Mass. president and general manager; John M. Cook, Burlington, vice-president; R. N. Cook, Graham, secretary-treasurer.

The corporation has acquired a building formerly occupied by the United Finishing Mills, and contract for remodeling has been let. Order has been placed for the initial equipment, including 100 30-harness dobby looms, for weaving fancy dress goods and novelties. The mill is expected to be in operation by January 1st.

The Anniston (Ala.) Manufacturing Company is making several building changes, adding approximately 8,000 square feet of floor space to the mill. When the extension is completed the machinery will be rearranged and new equipment added in the card room.

Incorporated with a capital of $500,000, the Jefferson Cotton Mills, at Pine Bluff, Arkansas, will expend about $25,000 in improving an existing building, and when these developments are made, machinery for manufacturing 72-inch sheetings will be installed.

The Union Springs Cotton Mills, at Union Springs, Alabama, have been purchased by the owners of the Cowikee Yarn Mill, at Eufaula, Alabama, Donald Comer, president. The Union Springs mill has been idle for several years, but the new owners will install up-to-date equipment throughout and place the plant in operation as soon as possible.

The Ottaray Mills at Union, S. C., which were recently sold by the Victor-Monaghan Company to G. H. Milliken, of New York City, have been purchased from him by the Monarch Mills, which operate mills at Union and Lockhart. This most recent acquisition gives the Monarch Mills a total of 160,452 spindles and 4,605 looms. Emslie Nicholson, treasurer of the Monarch Mills, is in charge of the entire property, but no change in personnel at the Ottaray plant will be effected by the new ownership, it is understood.

An addition to the steam plant is to be made by the Anderson Cotton Mills, at Anderson, S. C., and three large boilers will be installed for heating the mills and other purposes; the mills are operated by electric power.

A charter was recently granted the Alice Manufacturing Co., of Easley, S. C., with a capital stock of $1,000,000. Ellison S. McKissick is president and treasurer; A. F. McKissick, vice-president, and D. S. Burnsides, secretary.

Plans for the expenditure of approximately $100,000 for village improvement at the Gluck Mills, Anderson, S. C., was recently announced by R. E. Ligon, vice-president and general manager. This work, which is to cover a period

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Chicago Branch, 20 East Jackson Blvd.

of two years, has been begun. Curbing and draining of the streets of the village, and the installation of sewage service in each home, together with the construction of modern residences, are included in the development program.

The Darlington (S. C.) Manufacturing Company, has awarded contract to the Draper Corporation for 262 automatic looms with dobby attachments. They are also to install 11,776 Saco-Lowell spindles, and a vertical opener, waste machine and a 1,000-k. w. steam turbine—this equipment to replace old machinery.

The Beaver duck plant of the Couch Cotton Mills, at Greenville, S. C., was sold in August to C. J. Haynesworth, when put up at public auction. The mill has 5,600 spindles and 27 looms, and the price was understood to be $160,000.

Eno Cotton Mills, Hillsboro, N. C., are building homes for the additional operatives needed for the new spindles and looms to be installed.

The Cascade Mills, Inc., (formerly the Dixie Cotton Mills) at Mooresville, N. C., recently purchased by A. F. Bruton, will install 8,000 spindles and 400 Stafford looms for manufacturing dobby goods. Lockwood, Greene & Company are the engineers for the extension.

The Harriett Cotton Mills, Henderson, N. C., have arranged for increasing the capacity of the plant 50 per cent. Contract has been let to the Fiske-Carter Construction Company, of Greenville, S. C. The extension will be 100 x 104 feet, and the initial installation will include 4,000 twister spindles, and spoolers, winders and ball warpers. J. E. Sirrine & Company are the engineers.

A building 75 x 400 feet, to house an initial installation of 6,000 spindles for hosiery yarns, will be erected by the recently organized Millis Cotton Mills, at High Point, N. C. The machinery will be electrically driven. J. A. Millis is president, treasurer and general manager. J. W. Kaneer is superintendent.

James Cotton Mills, Maiden, N. C., with a capital stock of $200,000, have been incorporated by A. L. Quickel, J. D. Abernathy, and J. A. Abernathy.

Cannon Mfg. Co., Concord, N. C., has awarded contract for the addition of a new slasher room to its plant.

Magnolia Textile Corp., Magnolia, Miss., is to build a 60 x 80 foot addition and will install 50 new looms with other machinery.

Sylvan Cotton Mills, Shelbyville, Tennessee, have recently installed 70 new wide Draper looms in the two-story brick addition built some time ago. Other construction includes a commissary building and a new seven-room house for the superintendent.

The Couch Cotton Mill at Thomson, Ga., with 10,000 spindles and 208 looms, was recently acquired at an auction sale by Candler interests at Atlanta, Ga.

Inman Mills, Inman, S. C., are equipping all of their looms with Root pick counters.

Mooresville Cotton Mills, Mooresville, N. C., have just placed orders with The Root Company, Bristol, Connecticut for pick counters with which to equip the looms in their new mill. All of their old looms are equipped with the same type of production recorder.

The Laurens (S. C.) Cotton Mills are adding 20 new four-room bungalow type cottages to their village, each to be equipped with city water and electric lights.

The New England Mill Situation.

There has been a decided improvement in the textile industry of New England in the past month, following the rise in cotton and the expansion in cotton goods buying. Mills are resuming operations more fully and are now turning out more goods than at any time since May. It is still true that curtailment is noticeable in many directions, the Amoskeag Company, for example, being on four days a week time, and were running only 75 per cent of the machinery about the middle of the month.

In this instance, developments in larger occupation depend upon the naming of new prices on spring ginghams and other colored yarn products. Delay in naming these prices has been due largely to the lack of demand arising from the unwillingness of jobbers and cutters to make committments until they are better satisfied of their ability to sell ginghams profitably and liquidate some of their stocks carried over from spring. The finer and fancier grades are doing better than the staples.

The finishing industry is still indifferently occupied in some cases although gains have been steady since the first of the month. Buyers of merchandise have been very slow about making commitments for spring and this has led converters to hesitate about putting goods into work at the finishing plants. The job printers and bleachers have been quieter than some of the dyers. There has been a very good call for khaki effects and the dye plants specializing in them have done well. Drills have been sold freely for khaki dyeing but many other plain fabrics are also being used.

Bleacheries have been doing more on longcloths, nainsooks and other fine white plain weaves. There has also been an increased business on many of the 4-4 bleached cottons and prices are higher by a full cent a yard than a month ago, 12 cents now being the basis quoted on unbranded 4-4 goods, 64 x 60 basis. There has been a revival of demand for wide sheetings, sheets, and pillow cases and some of the better known branded lines are now sold ahead through November, one line being sold through January. There are some widths that are especially scarce for quick delivery. A much larger business could be taken care of on pillow tubings if it was forthcoming.

The business on fine cotton goods has come along more slowly than in the coarser yarn fabrics. But the gain has been decidedly marked and operations are constantly increasing. Voiles, lawns, pongees, dimities, fine sateens, poplins and organdies have been in better demand and stocks have been pretty generally cleaned up. The sharp advance in silk caused by the Japan earthquake has stimulated the demand for silk and cotton mixtures of all kinds. But there had been some resumption in the buying of cantons and other silk filled goods before September 1. The high price of thrown silk is already forcing a larger use of artificial silk for decorations in cotton fabrics, where silk was formerly used.

There has been a very good business done on fine pajama checks for underwear purposes and additional large orders have been placed for shadow stripes, and other fine warp sateens for ladies' underwear and lingerie purposes. The high price of silk is going to cause a larger demand for fine combed cotton goods next spring, it is generally believed in the trade.

The low prices at which combed yarns were quoted

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1. That a wearing surface of slag or gravel, interposing an armor-plate of fireproof rock between the building and flying embers, is an all-important factor in fire protection. (The National Board of Fire Underwriters give Barrett Specification Roofs the base rating.)

2. That the slag or gravel which holds in place the heavy, *poured* (not mopped) top coat of Specification Pitch, makes it possible to use more than twice the amount of waterproofing material that is practical where no wearing surface is laid. This fact holds good regardless of the type of bituminous material employed. And, as you know, it is the amount of waterproofing material that goes into a built-up roof that largely determines its life and service.

3. This wearing surface protects against surface wear—defies the scuffing of heavily shod workmen. The firmly imbedded gravel or slag is proof against erosion or washing away.

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finally led to some large sales that have cleaned up New England stocks more generally. There has also been a larger demand for combed yarns for the knitting trades and from mercerizers. Prices for contracts are still unsatisfactory, and save on special yarns, there has not been much forward business done by some of the spinners. The use of carded yarn stock for tire fabrics has diverted the demand for combed yarns so much that some mills are adding looms to their equipment, notably in the case of the large Manomet mills in New Bedford.

In connection with the business on tire fabrics, consolidation of large interests in the trade was made during the month, by which the Manville Company's properties at Woonsocket, R. I., and the Jenckes spinning interests in Pawtucket have become merged in a single corporation. The southern plant of the Jenckes Company is included in the merger. The Manville Company makes a wide variety of fine yarn goods for the jobbing and cutting trades and can use many of the yarns the Jenckes Company can make.

The talk of a consolidation of mill interests in Fall River has subsided but it is understood that some of the manufacturers there are quietly at work on plans that may come to a head when a favorable financial market evolves. One of the difficulties in the way of any consolidation lies in the number of official interests that must be placated or assimilated before success may be assured in gathering in the widely separated stock. The stronger units of manufacturing being formed in the South and in mercantile lines serve to whet the appetite for larger units in such centers as Fall River.

Print cloth trading has been quite active and the stocks of goods held at Fall River have been sold. These had not attained large proportions as the mills went along for weeks cutting down production to actual sales. There has been a larger demand for the odd widths and counts than at any time since April, so that Fall River sales for three or four weeks ran well in excess of the curtailed output. There has been a better call for many of the specialties in sateens, shade cloths, tobacco cloths, and hospital fabrics, made in Fall River. There has not been much late selling, although many mills have contracts in hand carrying forward about ten weeks.

Mills making jeans, heavy twills, drills, and specialties for the working suit manufacturing trades have done a very steady business at rising prices and conditions are now better than at any time since the early spring. There has also been an improved demand for tickings, denims, and many of the trousering fabrics. Mills making demasks, towels, and bedspreads have not yet secured as large a business relatively as that reported in other directions. Nor have they been able to secure prices in keeping with the advances in print cloths. The jobbing trades of the country have bought less actively than the manufacturing trades.

There has been considerable business accepted in specialties for the automobile trades but on the whole the tire fabric business has been spotty, and the very fine wide fabrics have not been bought as freely as the heavier grades made in the South. The manufacturers of fine light weight duck have been doing well in the narrow width goods but are still unable to get prices in keeping with cotton costs.

The large printers are busier than they were but the sales of percales on a basis of 12½ cents for 4-4 64 x 60s were most unsatisfactory, as they were stated to be based on 18 to 20 cent cotton. The sales of narrow prints made for export have been very large. In the week of September 15 the American Printing Company resumed full operations but some of the other printers are still running on short time or with some machinery stopped. The business on printed wash fabrics for spring has developed very slowly indeed and buyers talk as if they are going to postpone buying until December. If this proves correct they are going to be without many goods as printers are not accumulating and will not put fancy prints in work until buyers show some desire for them.

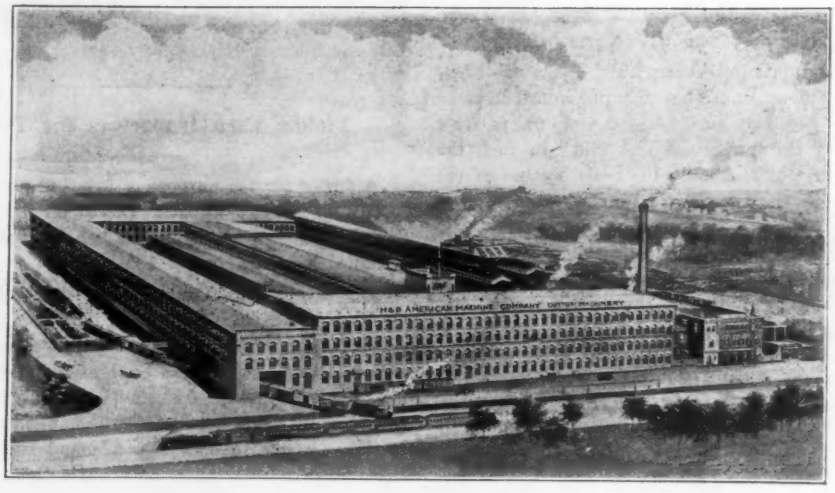
New England manufacturers, like most others, were caught short in the year's cotton markets. In the absence of business in July and the early part of August, they were unable to take advantage of the then low prices. The staple cotton users could not buy if they wanted to at that time as the plant had not been developed far enough to warrant traders in taking a chance with specific deliveries. Now that deliveries can be promised, prices are so high that manufacturers do not care to make long term engagements. There has been a good demand for cotton but it has been for deliveries running only 60 to 90 days ahead to cover actual cloth contracts booked. Most of the purchasing has been done in spot markets in the larger centers. There is still a feeling that when the weight of the crop begins to be shown in the year's movement from the farms, prices will be more favorable for the mills. But as matters stand, it looks as if mills are not going to get cloth prices up in keeping with 30 cent cotton now quoted.

On August 11 spot cotton was quoted at 25.25 cents and on September 15, 28.90 cents, a gain of 3.65 cents per pound. Prices for some gray cloths have risen as follows in that interval: 4-yard, 80 squares, 2 cents to 13¾ cents; 68 x 72s, 1¼ cents to 11 ¾ cents; 64 x 60s, wide, 1⅜ cents to 10⅛ cents; narrow, 1 cent to 7⅜; 72 x 68 carded lawns, 6-yards, 1 cent to 12¼ cents; combed lawns, 76 x 72s, 1¼ cents to 13 cents; sheetings, 3-yard, ¾ cent to 14¼ cents; 31-inch, 5-yards, 2 cents to 10 cents; 40-inch 2.85s, 2¼ cents to 15¼ cents; osnaburgs, 40-inch, 7 ounce, ¾ cent to 17 cents; drills, 37-inch, 3-yard, 2¼ cents to 15¼ cents; 30-inch, 3-yard, 2 cents to 15 cents; voiles, hard twist, 1½ cents to 16 cents; sateens, filling, 37½-inch, 64 x 88s, 4.7-ounce, 1¼ cents to 14 cents.

The low point on all of these goods represented values based on 21-cent to 23-cent cotton, so that mills have not yet been able to so widen their profit margin that they find encouragement in making long contracts. It is feared in the trade that this difficulty is going to continue for some time, owing to the resistance shown to higher priced cotton goods in consuming channels. For that reason an opinion prevails that mills will have to work on a much leaner profit outturn than last year. The annual meetings of many cotton mills will be held next month and it is going to be interesting to note how the curtailed production of last year affected earnings.

The Mossberg Pressed Steel Corporation of Attleboro, Mass., has just let a contract for an addition to their factory to take care of the large increase in business being received on steel loom beam heads, section beam heads, adjustable beam heads, new process drop wires and other products. A. A. Underwood, secretary and sales manager, is especially pleased with the favorable reports being received from mill men on the steel beam heads.

COTTON MACHINERY



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Pawtucket, R. I.

Southern Office: 814-816 Atlanta Trust Co. Bldg., Atlanta, Ga.

Cotton Comment.

BY H. AND B. BEER.

New Orleans, September 15th, 1923.

Inspired by the bullishness of the situation, present and prospective, due to the unfavorable progress of the crop and the scant reserve carried over from last season, we advised American spinners, particularly those in the South, one month ago to contract for their future wants immediately.

At that time returns to the government pointed to a yield of 11,516,000 bales, whereas the latest of returns to Washington indicate a production of only 10,788,000 bales, as a result prices are $12.50 per bale higher for spots, while contract values are about $17.50 per bale up.

Meanwhile the drouth in Oklahoma and Texas was broken by general copious rains, but the precipitation came too late to be of material benefit to the crop unless frost is late in making its appearance this fall. In fact, the rains had the effect of stiffening the basis because of the wet weather lowering the grade of so much cotton open in the fields.

It is believed that any addition to the crop in the southwest that might come of the rains, will likely be offset by further damage to the crop by weevil, worms, etc., outside of Texas, especially to the east of the Mississippi River where weevil and worms are reported more numerous and active than at any time this season, so much so that the consensus of opinion now is that outside of Texas this year's crop will hardly be any larger than last year, which was about 6,500,000 bales, and that the production in Texas will hardly be more than 4,000,000, if that much, which would provide only about 10,500,000 bales in all as the season's probable yield.

Of late there have been a few semi-monthly crop reports issued. Returns to the Memphis Commercial-Appeal averaged the condition of cotton at 49.7, pointing to a yield of only 10,240,000 bales. Returns to the National Ginners' Association averaged the condition at 52.4, indicating a crop of 11,080,000. Returns to the Gosho Co., Ft. Worth, Texas, averaged the condition at 54, pointing to a yield of 11,300,000 bales.

As will be seen by the above reports, there is a wide range as to the present indicated crop, ranging from 10,240,000 to 11,300,000 bales. The larger of the semi-monthly estimates would be none too large for world requirements since the world consumed 12,631,000 bales last season whereas if the crop should prove to be only 10,500,000 or less, the supply situation would be all the more acute.

So far this month, when the movement is becoming heavy, the market has ruled remarkably steady, especially in the face of the recent earthquake disaster in Japan and the uncertainty of the European political situation, trade and speculative buying having absorbed hedge selling in a satisfactory manner.

The low price level last season was witnessed at the close of September, after which the market continued to advance from about 19.50 cents to a little above the 31 cents level in the following spring. It is possible, unless the October government forecast promises a much larger crop than did the September Bureau report, which indicated 10,788,000 bales, that a repetition of last season's advance may be experienced this season.

Under the circumstances it would seem to be advisable for American spinners to contract for their future wants without delay, as there is every reason, more so than last year, to anticipate higher, perhaps much higher, prices ultimately.

Last season American mills consumed more cotton than was raised outside of Texas—6,991,000 bales vs. 6,540,000, whilst foreign spinners consumed of American cotton 5,640,000, which was only made possible by drafts on the surplus carried over at the beginning of the season.

This year there was no reserve of consequence carried over into this season, of American cotton only 2,573,000 bales vs. 4,897,000 last year and 9,364,000 in 1921, therefore, the world has to depend almost entirely on this year's crop for this season's requirements.

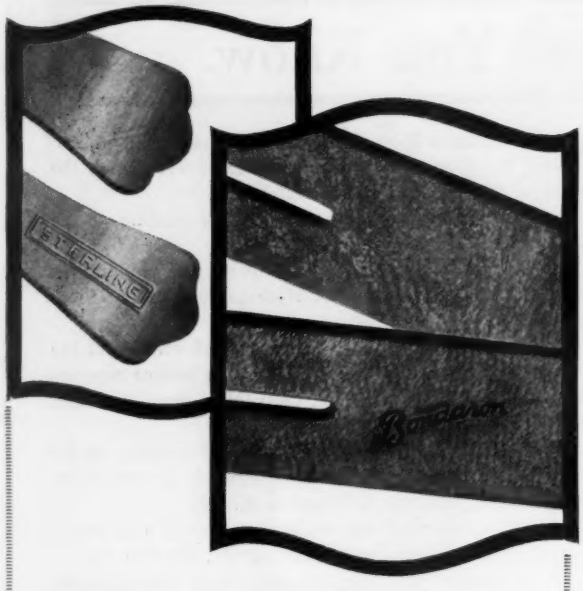
Field's Yarn Inspectors for Twisters.

A device for the purpose of insuring perfect inspection for ply in twisting has been placed on the market by the Saco-Lowell Shops, and is described in a pamphlet recently issued by them.

This is called the Field yarn inspector, and was developed by M. F. Field, the inventor of the warp drawing-in machine. On a machine to which this device has been applied, each end coming from the creel passes under a tube running the length of the frame. This tube is fitted with drop wire feelers. When an end breaks, permitting the feeler to drop, it sets in operation a sound signal—usually an electric horn—and lights an electric light that shows in which particular section of the frame the break has occurred, the exact location being shown by the drop wire projecting from the tube.

The device is in no sense a stop motion, it is pointed out—the horn and light remain in operation until the end is replaced. By this means the operative knows at once of the occurrence of a break and its location, whereas without such a warning, if the break occurs just after the operative has passed that part of the frame, it might be several minutes or more before the trouble would be detected. Consequently, considerable waste is saved, it is pointed out, and, in the case of beam twisters, the trouble in pulling the excess yarn from the beam is eliminated. An arrangement for turning the tube renders the apparatus inoperative during doffing.

The booklet states that the results shown in mills where large equipments have been in operation for a considerable period indicate an improvement in the quality of the product as well as a marked saving in the waste. It further declares that the effectiveness of the inspection possible on frames equipped with the detectors is such that some mills have found it desirable to twist directly from spools in the creel, instead of twisting from beams, or wound packages, thus eliminating the beam warping or the folding operation. It is stated that the tube is lint proof, and its operation is not easily tampered with, and that the device can be arranged for any number of ply desired. The detector may be furnished on new frames or applied to frames now in operation.



They May Look Alike— But the Difference is Vast

Leaving the hair on an ordinary check strap doesn't any more make it a *Bondaron Check Strap* than the addition of a suit of clothes makes a man out of a monkey.

Without the mark "Sterling" to guide them, the purchasers of silverware would be unable to distinguish the unreal from the genuine.

Plated silver looks so much like sterling silver that from the standpoint of the *appearance* there seems little to choose between them.

Ordinary check straps with the hair on so closely resemble the product bearing the name "Bondaron" that to the eye one check strap may *seem* to be as good as another.

But appearances are deceiving—"all is not gold that glitters"—and the army of "just as good" merchants leaves nothing but dissatisfaction in its train.

When a jewelry clerk shows you silverware you look for the name "Sterling" before you buy. When a mill supply man offers you check straps insist on seeing the name Bondaron. Unless the name is there you won't get the genuine—and if you don't get the genuine you *can't* get Bondaron service.

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Notes About Men You Know.

CAPTAIN ELLISON A. SMYTH, who recently sold his interest in the Pelzer Manufacturing Company, Pelzer, S. C., and who now plans to retire, was the recipient of two tokens of esteem from the folk of Pelzer at a meeting held on August 28 in the Pelzer auditorium. The operatives of the company presented Captain Smyth with a white gold watch, and the merchants and professional men of the community gave him a diamond scarf pin. The meeting was presided over by J. W. Kelly, superintendent of the mill.

CHARLES H. WILLIAMSON, for the past twelve years secretary and treasurer of the Bibb Manufacturing Company, Macon, Ga., died suddenly on September 3 of angina pectoris at the home of his brother-in-law, Brigadier General Walter A. Harris.

J. B. HUMBERT, who for a number of years has been secretary and assistant treasurer of the Orr Cotton Mills, Anderson, S. C., has resigned to become manager of the Seneca Mill at Seneca, S. C., which was recently purchased from the Victor Monaghan interests by Goddard Brothers, of Providence, R. I.

MARSHALL P. ORR, president of the Inverness Mills, Winston-Salem, N. C., succeeds Mr. Humbert in the Anderson position.

D. D. PROPES has been made overseer of carding at Mill No. 2, Baldwin Cotton Mills, Chester, S. C. Robert Land, formerly of Newry, has become overseer of night spinning at Mill No. 1, and H. Cranford, formerly at Lockhart, has been made overseer of night weaving.

J. F. DARRACOTT has changed from overseer of the cloth room at the Thrift Mfg. Co., Paw Creek, N. C., to accept a similar position at the Union-Buffalo Mills Company, Union, S. C.

J. J. BARRETT has accepted the position of overseer of weaving at the Thrift Mfg. Co., Paw Creek, N. C., succeeding John Wallace, resigned.

JERRY WENTZ AND A. HARRISON WILEY have been made overseers of weaving at the No. 4 Mill of the Dan River Mills, Schoolfield, Va.

J. R. COPELAND has resigned as overseer of weaving at the Dan River Mills, Danville, Va., and accepted a similar position at the Judson Mills, Greenville, S. C.

J. H. MATTISON has become superintendent of the Dacotah Mills, Lexington, N. C. He was formerly overseer of weaving at the Dan River Mills, Danville, Va.

J. B. WRIGHT has become superintendent of the Nokomis Mills, Lexington, S. C. He has recently been superintendent of the Fieldale Mills, Fieldale, Va., but previous to holding that position had been for seven years superintendent of the Nokomis Mills.

FRED L. STILL, formerly overseer of carding at the Arcade Cotton Mills, Rock Hill, S. C., has been appointed superintendent of the Aragon Cotton Mills at the same place.

W. J. STILL has resigned as overseer of carding at the Kershaw (S. C.) Cotton Mills and become overseer of carding at the Arcade Cotton Mills, Rock Hill, S. C.

R. H. CLAYTON has become overseer of weaving at the Mary-Leila Cotton Mills, Greensboro, Ga., succeeding E. P. Hollis. Mr. Clayton has been overseer of weaving at the Imperial Cotton Mills, at Eatonton, Ga.

WALTER POPE has become overseer of carding at the Elizabeth Mills, Charlotte, N. C.

J. L. RHINEHARDT has become overseer of spinning at the No. 5 Mill of the Chadwick-Hoskins Company, at Pineville, N. C.

J. P. ELLER has resigned as overseer of weaving at the Inverness Mills, Winston-Salem, N. C., to become superintendent of weaving at the Art Cloth Mills, Inc., Gastonia, N. C.

J. B. THREATT has become overseer of spinning at the Kershaw (S. C.) Mills. He was formerly at the Chadwick-Hoskins Mill No. 5, Pineville, N. C.

DOUGLAS TOMPKINS has accepted the position of superintendent at the Hamilton-Carhartt Mills, Elberton, Ga.

J. M. Cox recently became overseer of dyeing at the Oneida Mills, Graham, N. C.

JOHN J. KIMMERY has been promoted from second hand to overseer of spinning at the Oneida Mills, Graham, N. C.

JOHN D. TEMPLETON has been transferred from overseer of spinning to overseer of carding at the Kershaw (S. C.) Mills.

M. H. MCLENDON has resigned as superintendent of spinning at the No. 1 Division of the Loray Mills, Gastonia, N. C., to become superintendent of the American Cotton Mills, Bessemer City, N. C.

JOSEPH R. PUCKETT has resigned as assistant carder at the Loray Mills, Gastonia, N. C., to become overseer of carding at the American Cotton Mills, Bessemer City, N. C.

J. F.THORNBURG is now superintendent of the George Mills, Bessemer City, N. C. Until the change he was overseer of carding at the Vivian Mills, Cherryville, N. C.

L. M. MANLY is now overseer of carding at the Osage Mfg. Co., Bessemer City, N. C.

NEWTON WILSON, superintendent of the Anniston Cordage Mills, Anniston, Ala., died recently at his home.

JOHN KILLARS, it is reported, has resigned as superintendent of the Woodstock Mills, Anniston, Ala.

W. C. TAYLOR is now representing the New York and New Jersey Lubricant Company in North Carolina, under Lewis W. Thomason, southern manager. Mr. Taylor was formerly with the Texas Company, with residence in Greensboro.

H. E. RUNGE, who for five years has been assistant superintendent of The Trion Company, Trion, Ga., has resigned and has become associated with the southern office of the Draper Corporation.

ERNEST M. POTTER has been appointed district manager for S K F Industries, retaining headquarters in Charlotte, N. C. W. H. Holby, who for several years has been district manager in the South, has been promoted to the position of manager of the textile division, and will have headquarters in the main office at New York. T. S. Jackson, who has had headquarters at the Atlanta office, will now make his headquarters in Greenville, S. C.

N. MILLER now has charge of the Atlanta office of the S K F Industries, representing the company in that section.

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If you simply set the dial to the number of minutes you wish to run, this remarkable little device stops the machine and calls the operator to remove the load. Here, in the Tolhurst Automatic Timer, is the means of immense savings in time, labor, power and too highly extracted loads. Any direct motor driven TOLHURST SELF-BALANCING Extractor may be converted to full automatic by the application of this simple device.

Write for full particulars today or see the Timer in operation at the International Textile Expositon, Boston, week of Oct. 29th, Booth No. 58

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THE savings made by the U S B & S Co. Products are a real economy—not only because the immense organization with eight big factories has such vast resources and buying power that higher class products can be produced at a lower cost, but because U S B & S Co. Products are designed by the most expert and experienced textile engineers to give more pe fect satisfaction and longer life. Every product bearing the name U S B & S Co. must live up to the enviable reputation established years ago.

U S Bobbins are stronger, lighter and absolutely smooth and true. A system of testing every bobbin on your own spindles eliminates any that do not run true.

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U S Shuttles are made in every type for Draper, Stafford and C. & K. Looms. Other U S B & S Co. Products include the following:

BEAMS	SPOOLS	BOBBINS	ROLLS
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SKEWERS	Jack	TWISTERS	
	Silk	TRIPTODS	
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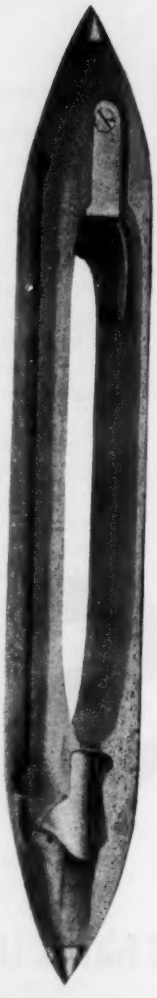

U S BOBBIN & SHUTTLE Co.

LARGEST BOBBIN and SHUTTLE MANUFACTURERS in the WORLD

Eight Factories

Providence R.I.

An Old Timer Says

Do you give orders in that egotistical way that causes an overseer to rebel against you, or do you give your men a chance to show what is in them, by making your orders have a suggestive flavor which encourages an overseer to use his brains and have that feeling that he is something more than a machine and that he can have the pleasure of getting at least part of the credit for carrying out your ideas?

There certainly is a great lesson for all superintendents to learn in giving orders.

Of course I know there are many things which must have the force of a positive order behind them, but the great majority of a superintendent's work can be conveyed to his overseers in such a way that the men will enter into the work with a good spirit and with an honest effort to do their best to make the idea a success.

Mr. Superintendent, have you got the ability, the foresight, the good judgment, to go at your men that way?

A superintendent should study the personalities of his overseers in a much more thorough manner than he studied his section men and operatives when he was overseer.

The superintendent has a much more intelligent man to give orders to than he had when he was overseer.

Overseers are capable of looking at a problem with a much broader view than the men you worked with when you were overseer yourself.

Many superintendents, yes, a majority I believe, fail to get the whole-hearted cooperation of their overseers because they have forgotten how they felt when their superintendent gave them orders.

So many of us go through the "School of Hard Knocks" and then forget the lessons we learned while there. "It is easy to forget" is a very true saying and it is also a very costly one.

Many of us forget how we felt toward our overseers while we were running a section, and so many superintendents seem to entirely forget that they have ever been an overseer at all.

No superintendent can run a mill by himself, it matters not how small the plant may be—that is a fundamental fact which all will admit—then why in the name of common sense doesn't the average superintendent do more to inject that valuable asset of cooperation and honest loyalty into his men?

Don't get it into your head that because an overseer is not pulling right along with you as he should that it is always his fault. "Old-Timer" claims that nine times out of ten it is the superintendent's fault; you are not handling that overseer right; you are not appealing to his pride in the right way; you are not giving him full credit for the things he deserves credit for. Civility, you know, is a lubricant that can be applied to other things just as your oils and greases are applied to wheels, bearings, etc.

Just study that word "civility" for several days. Do your level best to see how many ways it can be applied to your overseers for one straight month, and then take stock. Look back over the month's work and you will begin to realize how much more pleasure your job has been to you. And your overseers—well, you will believe they have been greased all over sure-enough. "Civility" is some lubricator, and it is so cheap that the great wonder is that superintendents do not use more of it.

If the average superintendent would adopt the plan of "hire and educate" rather than "hire and fire," he would be surprised how much better results he would get from his overseers, and they in turn would unconsciously pass this same teaching along to second hands and section men.

Just remember, Mr. Superintendent, that your personality, your methods of work, your manner of approach, your civility, your enthusiasm, your "pep," your promptness, your cussing—yes, almost your very thoughts will have their direct bearing on your overseers.

Why, oh why, are you so careless with these things when if you only stop and think you will admit that they go a long way toward spelling that big word "Success?"

A really good man, you know, will progress toward the larger jobs, and will finally attain the job with the big salary.

I am only trying to talk to you in a real personal way. I want to get right next to you if I possibly can. "Old-Timer" has been over the road and has grubbed many a stump out of the way that it took years to do. Surely you do not think I am trying to pull you down. For the love of Mike, No! So come on, now, let's go after that better job.

It's a long lane that has no turning, but don't forget *you* have got to help to make that turn.

The solid facts are that you must make yourself a profitable investment for your employer or you need never expect to get more salary or even hold the job you have. Because you can't stand still, you know; if you stop progressing you are going backwards, and first thing you know, one of these young, full-of-pep, well educated overseers will pass you like a Packard passes a tin-lizzie.

Some superintendents seem to be afraid they will make themselves too profitable to their employers—such a man is generally the fellow who settles down to dry-rot.

Remember when you are a profitable investment to

(*Continued on page* 1019.)

PRICE

Lodestone or Millstone?

Price, for some firms, is a magnet that attracts trade; for others, a millstone that sinks the business.

Too many houses, when business slackens, curtail production and raise prices to cover the mounting overhead. They lose their market to those who have the foresight to seek more efficient methods — with the courage actually to *lower* prices and the energy to force sales.

A plant operating at 60% of its capacity can not afford to consider 100% of its fixed charges and other invariable expenses as the cost of production. Unearned burden, a part of the cost of doing business, should not be included in the cost of the product.

Even those firms having little competition, can increase sales by reducing prices. Price reduction stimulates consumption and broadens the market to include new purchasers who would not buy at the higher price.

Price based upon actual cost of production under efficient methods is a lodestone—a magnet. Price based upon cost of production plus unearned burden is a millstone. One means progress; the other, retrogression.

Sound methods of Cost Accounting make it possible to apply burden as it should be applied. Such methods also disclose the weaknesses and wastes inconsistent with efficient management.

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DRAW-IN only one time and change to any cloth when you weave with

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N. B.—We are the sole manufacturers of Nickel-Plated Drop Wires for every kind of loom.

How Other Men Manage

Practical Discussions by Cotton's Readers on all varieties of Mill Subjects

Asks Information on Filling Wind.

Editor Cotton:

The changing from warp to filling wind in spinning cotton warp yarn on ring spinning frames is causing many experiments to be made in the designs of the warp type bobbins used, and your readers will be very much interested in a discussion on this subject.

It is unquestionably practical to materially reduce the diameters of the barrels of the bobbins and to lengthen the traverses, thereby getting more yarn on the bobbins, in addition to being able to run with higher front roll speeds.

In reducing the diameters of the barrels of the bobbins, heavier travelers are used, and it seems to be desirable both in this connection and in lengthening the traverses of the yarn on the bobbins, to have a filling type cone at the bases of the bobbins to reduce the traveler pull when the traverse is at the bottom.

As the average diameters of the yarn loops on the bobbins are reduced with the smaller barrel bobbins, the spindle speeds must be increased to compensate for the reduced length of yarn wound per revolution on the bobbin.

Will not some of your readers outline the changes which they have made in the designs of their bobbins, speeds, etc., when they changed from warp to filling wind, and in doing so, state how much additional yarn they are getting on bobbins, the saving in doffing and any other interesting facts on this subject, which is receiving so much attention at this time? Filling Wind (Ga.)

Clothing and Taking Care of Cards.

Editor Cotton:

I have read several times the letter of "W. V. J. (N. C.)" in the August issue regarding "Clothing and Caring for Cards." Of course we all have good ideas and several different ways of doing our work. The one biggest object as far as I can see is to get as good a quality and if possible a little better one than the next man.

In my opinion, however, "W. V. J.'s" method of cutting a taper is wrong. I would like to ask if he actually does clothe his cards the way he said or if he was taught that way in a textile school. I can say that because I am a textile graduate myself, so I hope he will have no hard feelings. I have learned by books how to clothe cards, but, believe me, when you come to clothe a card the best thing to do is to leave your books down cellar and take the one thing that is necessary: the practical experience that the mill men have learned through years of work; and you will find that is the best of all.

"W. V. J." says he cuts his clothing 75 inches in the center and then pulls the wire from the fifth row or rib three inches long. Now, right there I believe if he would be careful and pull the wire a longer space he would make a better cut and get a much better fit, for using three inches you have to cut too sharp an angle, and it leaves a hole. The length of his taper may be all right, but I never cut it more than 12 feet 5 inches for a 50-inch card, and have always come out fine.

By cutting my taper this length I usually have about nine inches to where I make the butt or shoulder; then I start the taper on the opposite side. I never actually measure 18 inches, to take from your finger point to your elbow and call it 19 inches, would be close enough.

I understand "W. V. J.'s" method all right, but I don't see how he can make his last tape by measuring 18 inches to a rib, although he may be right. I use no rule on the last measure and don't see how it can be used with good results. When we apply the clothing on the cylinder we tap it a little so as to lay it close together; the chances are we may tap a little harder in one place than another so when we come to the last taper they will not come 18 inches apart on each rib; we may get a 15 inch, or a 17 inch, or a 19 inch, or maybe a 20-inch space before we can pull the wire; there is, to my mind, no way out of it; you cannot come exactly 18 inches on every rib.

The safest way I know of and the best I have ever seen is to do it as follows: Take a piece of clothing four ribs wide and make a gauge, say, about three or four inches long. Run the clothing as long as the full width of the clothing and the gauge runs free or as near the side as you wish to get and then start and pull the wire on that rib until the gauge will go no lower and then start on the next rib and keep on until the four are pulled to where to make the butt. Now, where I pull I don't cut, because by not cutting I can put it on with full pressure. I simply tack it a few times, for when I start to pull wire on the other side, I loosen on the clothing machine and draw out wire to fit the cylinder, regardless of the inches to the rib, and make long cuts so as to have no sharp angles in the clothing. After having pulled four ribs I cut it for some length. Then I pull back to where I last tacked it, take up all slack and start clothing, tacking here and there to hold it firm and run to where I first started to

We invite our readers to make use of this department for the discussion of any and all problems arising in the mill or the finishing plant. Questions, answers or letters need not conform to any particular style and will be properly edited before publishing. The editors do not hold themselves responsible for any statements of opinion or fact which may appear in this department unless so endorsed. This department is open to all.

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pull out wire. (This is where the strip of four ribs starts.) There I slack again and draw my clothing four ribs over where the wire is to be pulled out, take a pencil and trace where the clothing will fit and then cut. This way gives a very neat job and also a very close fitting one.

"W. V. J." says the taper ends should be applied at about 40 pounds to the rib. I would like to ask him how many taper ends he has broken. I will admit that 350 or 400 pounds is all right to apply two-inch fillet, but on a taper end you cannot safely apply 40 pounds to the rib. I am very careful when clothing to put it on very smooth and have the back rubbed in black lead. The next day I tack it and put on the drum for a few hours, then the traverse grinders, until I believe my clothing is perfectly smooth.

The finished product of a mill is no better than the quality obtained at the cards; very true, but you sure have got to have a nice even lap, or you cannot make a good web, no matter how you try.

No grinder should have more than forty or forty-five cards to take care of anyway, and he should, above all things, be a very competent man. There are many who grind cards, but very few of them are really grinders. Cards should be ground in turn, unless damaged by jams or faced, and if you give the grinder 40 or so cards, your cards are ground often enough and only a light grinding is necessary. I firmly believe that a grinding of a few hours is enough, say, from three to five hours. Of course, if the clothing is faced or jammed it may be necessary to grind longer. I believe, however, that too long a grinding spoils the point of the wire. One very important thing many grinders do not do: that is, they don't re-cover the grinding rolls often enough. Why, I have seen some that don't do any grinding at all because they are worn so smooth, and such rolls only polish the wire, that's all. Many readers of COTTON will be surprised if they will go look at their grinding rolls.

As for grinders, "W. V. J." is right. I have seen grinders who couldn't set a licker-in, doffer or flat right. It's a shame to say so, but it's the truth, and if a man tries to show them they get peeved, especially if the man is an old man and he has been grinding for some time. And you will hear something like this: "Well, I learned from a man who has ground cards for fifty years, and he ought to know how." That's so, he might have been a very good man then, but we are now in modern times with modern machinery, and we have to keep up with it, and if we have to change again next year we will do so. There is so much competition today that we have to turn out our yarn as good or better than the other fellow, or he will get everything and we will get nothing.

Another one will say, "Well, that's how we do it in Canada." Never mind Canada. If they like them so well why don't they go back. They are in the United States now and they will have to use U. S. methods as long as they are. They said they were setting the flats to a ten when I could hardly feel a friction with a nineteen. One grinder refused to start a card after I had set it because he thought the flat would fly off.

One important thing is that the lap roll should be grooved or given a rough surface so that there will be no stretch between it and the feed roll. Many don't believe there is stretch there, but they surely would be surprised if care were taken to examine it.

The licker-in should be set correctly and accurately. In setting the licker-in the boxes should be loose and the licker-in pushed right up against the cylinder and then set away from the cylinder; when set in this way there is no need for fear that they will ever damage the cylinder. (The flats and doffers should be set hard to the gauge and worked off in the same method as the licker-in.) Many a grinder never looks at his licker-in for full or bent points after grinding his card. He should do so, and if any are found, it is his duty to straighten and sharpen them. A file of the proper shape can easily be run between the teeth, and believe me, there will be a difference, a big difference, in the web. But they will get out of that if they can. They say, "It's too much work." Tell me, how is a licker-in to do its work if not taken care of properly. Why should they believe because it is heavy that it does not need to be looked after, or never does wear out? Some grinders have told me, "If they want it sharpened, let 'em send it to the shops." Such men are only looking for pay day; certainly they are not working for the benefit of the corporation.

We all know the working features of a card are the licker-in, cylinder, flats and doffer, but they have to be ground and set right, have they not? The cylinder and flats may be as sharp and even as they can be ground, but if not set right the result will not be satisfactory. We know that the cylinder can be ground so as to be high in the middle and low on the sides. Let the screens drop or get dirty and gummy and the result will be a bad web, all bunchy and full of holes. There are many other little things on a card which help to do its work, and if they are not taken care of properly, how can a man expect results? The best way that I can figure out for getting good results is: get a good grinder.

E. A. G. (N. H.)

An Old Timer Says.

(*Continued from page* 1015.)

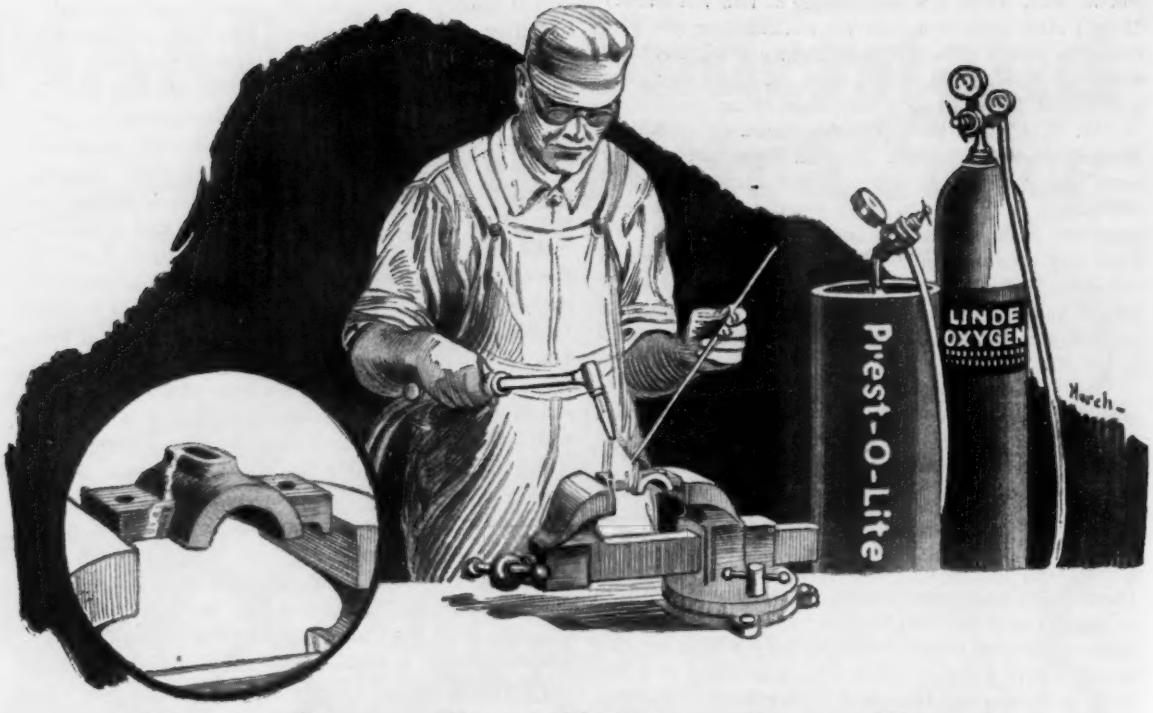
your employer either he will reward you or *some other employer will.*

Talk about opportunity! If you are a superintendent you have the opportunity, it matters not whether you are with a large firm or a small firm, or stuck off in the backwoods somewhere. If you make yourself a profitable investment for your employer, old Mr. Opportunity won't stop to knock at your door—he will just come "busting in" and run all over you.

If you lay COTTON down and say, "Well, I guess 'Old-Timer' is about right; I will start in next month or some time," that means you won't do it.

But if you are man enough to do what you say you will do, give yourself your word that you will make a start right now; then you will be put on your honor, you will have something to brace you up when everything goes wrong.

If you find, after a trial, that it works, just drop a line saying, "Old-Timer, I'm with you." That will make my heart glad and give me encouragement. Maybe I can give you something later that will again benefit you. Have you got the grit?



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Making Ratine Yarns.

Editor Cotton:

We shall appreciate it if some of your readers who are experienced in that kind of work will furnish complete details for the manufacture of ratine yarn on the spinning frames, and also the method for producing nub or spiral yarn on twisters. We would like to have them furnish all necessary data, including calculations for setting machinery, changes necessary, etc. Contributor No. 57.

Is a Coneless Speeder Possible?

Editor Cotton:

For the first time I am going to ask the readers a favor. I would like to have them make a close study of the new differential described in the June issue of Cotton, page 691, and see if a coneless speeder is possible with such a device. It will be remembered that a couple of years ago I said that a coneless speeder was possible and the time was near when such a frame would be on the market.

Now, what do the readers think? Wash (R. I.)

A Unit of Hardness for Yarns.

Editor Cotton:

This is a letter that concerns each individual reader of Cotton.

Have you ever had occasion to think or talk like this:

"Gee, this thread is much *harder* than that."

"Yes, but *how much?*"

What is your answer to this?

At other times we might say: "This book is exactly two pounds heavier than that one," or "This yarn is two thousand yards longer than necessary."

Here is the point. In expressing the heaviness of an object, we have a fundamental unit, the pound, which is constant and can be applied to anything having weight, regardless of the character of the object itself. In length also we have a unit, the foot or yard. But what is our unit for the hardness of cotton yarn?

Some wise friends of mine have suggested that we use "turns per inch" as the unit for hardness. My answer is: "You're wrong." This cannot be applied universally, regardless of other factors. In other words, it depends upon something. It depends upon the number of the yarn under consideration. It is perfectly all right if the two or more yarns being compared are of the same number, but you can't compare those yarns except with other yarns of the same number. For instance, if we put 20 turns per inch to 10s, 50s and 100s, everyone knows that they are not of the same hardness. It would be too soft for 100s, a little harder for the 50s, and the hardest of the three for the 10s. But still the turns per inch are the same. The turns per inch would prove a very convenient unit if not for the very shortcoming just pointed out.

Now you are ready to digest the following if you get the foregoing all right. But be sure to get the idea first before you read on, otherwise your time will be wasted.

There is really a common unit which is not affected by any other factors and which is common to all yarns regardless of the number, and by which we can compare or measure the hardness of any yarn just as easily as we can measure or compare their lengths in terms of feet. And that common unit is "The Angle of Yarns."

I have just completed my proposed table for hardness of cotton yarns in terms of degrees of the angle of yarns. It is very easy to use, nothing mathematical about it at all. Here it is:

Proposed Table for Determining the Hardness of Cotton Yarns in Terms of the Degrees of the Angle of Yarns, Also the Corresponding Twist Multipliers.

Twist Multiplier	Angle Deg.	Min.	Hardness
6.25	25	30	
6	24	40	
5.5	22	45	
5	21		
4.75	20		Hard
4.5	19		
4.25	18		
4	17		
3.75	16		
3.5	15		
3.25	14		Medium
3	13		
2.75	12		
2.5	11		
2.25	10		Soft
2	9		

Anyone who would like to know how the table is made up, and who does not mind using a little mathematics, is referred to my article in the June issue of Cotton under the title "The Angle of Yarns,' and also the correction on page 857 of the August issue. For those who do not care for the mathematical part of it, the following summary might be helpful. In my June article these facts were proven:

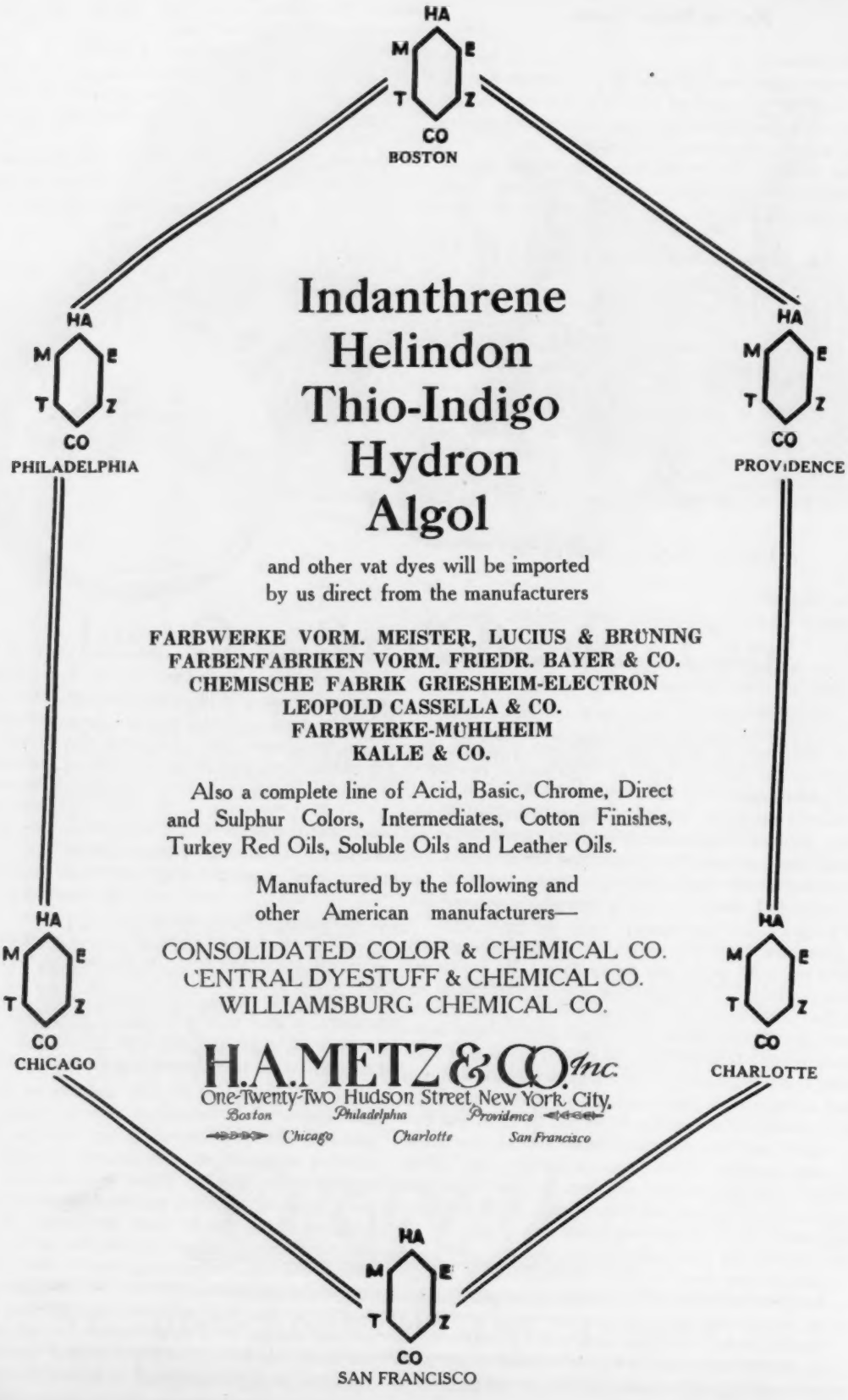
(a) That the angle of the yarn is constant when the same twist multiplier is used, regardless of the number of the yarns, or, to make it plainer, when you use 4 as a twist multiplier, you will get 17 degrees as the angle of the yarn (see table), no matter what number or count of yarn is being made, whether 10s or 100s.

(b) In order to get these results, we use a twist multiplier and the square root for determining the turns per inch to use, and

(c) That the formula for calculating the angle is

$$\text{Tan } a = \frac{2 \times \text{twist multiplier}}{26.1}$$

Now I will explain the table and how to use it. The first column is the column of twist multipliers that we ordinarily use. The second column contains the corresponding angles of the yarn secured when the different multipliers are used. A glance over the table will show that it runs very regularly and the twist multiplier and the angles are very near to direct proportion. It could be said for all practical purposes that they are in direct proportion although, theoretically, they are not. One degree is equal to ¼ difference in the twist multiplier, approximately, so that it is very easy to remember and figure out the degrees or twist multipliers without referring to the table when one of the two is known. Of course, with the table, all that is necessary is to look for the one cor-



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responding to the one that is known. Thus no figuring at all is involved.

The third column is the proposed classification of hardness of cotton yarns. All those having an angle of 12 degrees or less (corresponding to a twist multiplier of 2.75 or less) shall be classified as "soft" yarns. All those having an angle of 12 degrees up to and including an angle of 16 degrees (corresponding to twist multipliers from 2.75 to 3.75 inclusive) shall be classed as "medium" yarns. All those having an angle larger than 16 degrees and up to 26 degrees shall be called "hard" yarns, and those having still a larger angle shall be called "extra hard" yarns, not shown in the table.

Now let's see how this system will work: Suppose we have two yarns, a 25s and a 30s warp yarn. For the 25s we used a twist multiplier of 4.25, and for the 30s we used a twist multiplier of 5. Naturally, the 30s is a harder yarn. Yes, but "how much"? Let's look at the table. In the second column opposite the 4.25 twist multiplier we find that the angle is 18 degrees. Similarly we find that we get 21 degrees as an angle when we use 5 as a multiplier. The difference is three degrees. Then the conversation will be somewhat like this:

"The 30s is harder than the 25s."

"Yes, but how much?"

"Exactly three degrees."

Now, you see, we have something to go by. We have *degrees*, which is just as convenient to use as pounds or feet. We are in a position to measure the hardness with a scale, while before we didn't know what to say, except that "it is harder," not knowing how much.

With this unit of measurement we can do a lot of things which we could not do before. Let us take up another example. Suppose we have three kinds of yarns, 100s, 50s and 10s. All of these have 20 turns to the inch twist. It is desired to know their respective hardness. We proceed as following:

First of all, we find the twist multiplier used for each. It is a very easy thing to do, thus:

$$\frac{\text{Turns per inch}}{\text{Square root of count}} = \text{twist multiplier, so}$$

for the 100s, $\frac{20}{\sqrt{100}} = 2$ twist multiplier

for the 50s, $\frac{20}{\sqrt{50}} = 2.82$ twist multiplier

for the 10s, $\frac{20}{\sqrt{10}} = 3.16$ twist multiplier.

Having found the twist multipliers, we turn to our table to get the corresponding angles, as follows:

No. of Yarn	Twist Multiplier	Angle
100s	2	9 degrees
50s	2.82	12° 17′
10s	3.16	13° 38′

It is easy to get the first one, but the second and third need a little explanation. There is no 2.82 in our table. We look for the ones nearest to it, the next smaller one and the next larger one, 2.75 and 3, respectively. For 2.75 the angle is 12 degrees and for 3 the angle is 13 degrees. As our number lies between the two, we know that our angle is between 12 and 13 degrees. Then we proceed as follows:

2.82	12°	×	3.00	13°
—2.75	12°		—2.75	12°
.07		×	.25	1°

1° equals 60 minutes.

So by proportion we get

$$.25 : .07 :: 60 : x$$

$$x = \frac{60 \times .07}{.25} = 17 \text{ minutes, approximately.}$$

Add the 17 minutes to the 12° for the answer.

In the same manner we get the third one as follows:

3.16	13°	×	3.25	14°
—3.00	13°		—3.00	13°
.16		×	.25	1° or 60′

By proportion we get:

$$.25 : .16 :: 60 : x$$

$$x = \frac{.16 \times 60}{.25} = 38 \text{ minutes, approximately.}$$

Add the 38′ to 13° for the answer.

Now we can answer the question "how much" definitely, as saying the 50s is 3 degrees and 17 minutes harder than the 100s and the 10s is 1 degree and 21 minutes harder than the 50s.

Another thing we can do with the help of the unit of hardness, the angle of yarns, or whatever you may call it, is that we can record our tests later on in terms of this unit as to strength, kink, twist multiplier to use, the effect of the change of twist multipliers, moisture content and other things. So with the introduction of the unit—I'd better say discovery, because the unit has always been there, only we did not use it or did not know about it—we can deal with all sorts of yarn problems in terms of the unit with ease just as we can deal with all sorts of problems in weight with the unit of pounds or in length with the unit of feet. H. H. Y. (Mass.)

Getting Rid of Lumps and Slugs.

EDITOR COTTON:

The article on "Combatting the Slug and the Bunch," by "Bill (Mass.)," on page 475 of the April number, brought to my mind an experience I had some years ago on an export order. This could be made at a fair profit, but the customer made it distinctly understood that the goods must be free from defects such as gouts, slugs, lumps, etc., as this would injure the sale.

This meant an extra amount of effort in eliminating these defects, and we at once began cautioning the operatives in the picker rooms, and cleaning everything we could think of, especially wiping out the beaters on the insides around the beater boxes and watching for anything that might cause a lump to form on the inside later to turn loose and make a bad place in the lap.

On the cards we had quite a lot to contend with, but it only meant wiping instead of fanning off the cards, and keeping them wiped. And in taking down the flat strippings we were careful to see that none of them fell into the work, and kept the underside of the doffer cleaned out

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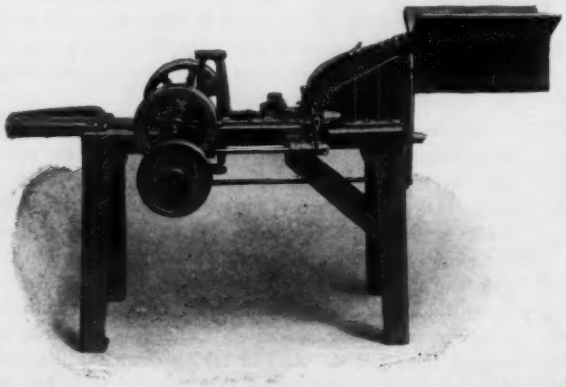

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as well as under the licker-in, and around the cylinder screen. Fly will form under these places and when high enough for the air current to draw them in they will be sucked into the stock and go on in for a lump. On stripping the cards they must be stripped clean, or else fine white and brown neps will show up in the work. Let a doffer comb belt break and the sliver wrap up around the doffer, and let the cylinder get filled up with this, and the result will be bad, showing a tremendous amount of neps and trash.

At the drawing frames we found the most dangerous place visible to the operative, a difficulty that should have been remedied at the beginning, and that was when the cans of sliver were placed too far under the knock-off spoons. At this place there is always a certain amount of dusty, dirty short fibers formed ready to drop, and when the cans are set directly underneath, there is nothing else to do but for these fibers to drop into the can to be carried into the stock, making a lengthy gout or slug. This was remedied by placing a ½-inch strip of lumber in line back of the drawing frames so that the cans could not be placed under far enough to catch this waste when it was dropped off from the knock-off spoons. This, in connection with a more careful system of cleaning, did away with an amount of defects that was hardly believeable. Cleaning underneath the coiler head plates regularly helped a lot.

With reference to oiling the cuffs on the top rolls, we clean our rolls every two weeks. We have two processes of drawing frames and clean one process one week and the other next week, oiling and cleaning the cuffs each time, and we hardly ever have any dry ones. All clearers should be picked regularly, and care taken not to allow any to drop onto the stock. Sometimes the clearer cloth will become worn and not hold the fly. If not worn completely out, this can be remedied by carding the flannel off with card clothing, or by turning the cloth around if it has not already been turned. One good way to clean them—if the mill has an air system—is to take them off and carry them to some place and blow them out. The air will clean them thoroughly of all small particles of trash. It will also be noted that if empty cans sitting idle in the room are not turned upside down they will catch and accumulate quite an amount of settlings, resulting in slugs.

Bunches—that is, white bunches—can be made by the slivers running too slack in the tension on the drawing frames, the ends sagging down and catching up or looping up at its sides, making white bunches. Dry cuffs, or worn cuffs and flutes, together with atmospheric conditions, will cause ends on the drawing frames to sag down and eventually loop in on the slivers, making a lump. Most any good carder already knows these remedies: fix the worn parts, and change the tension gears to conform with the atmospheric conditions, or change the atmospheric conditions if able to do it, which, of course, means that if the windows are open too much, to close some of them to suit the conditions.

Slubbers are the same as the drawing frames, with regard to the tension. If they are not kept right in heavy atmospheric conditions they will sag and loop up and go in double, which causes a lump, broken down ends, and when an end is down on the frames it will fly around and thrash the adjacent bobbins causing white fuzzy lumps on them, and they, of course, go on into the work and are easily detected in either the yarn or the cloth. This is true on all roving frames, and should be avoided as much as possible. When the operative puts up such an end that has been down for some time, this waste should be cleaned off, the clearer boards underneath first and, second, the rollers on the slubbers. If these are not kept picked clean they will fill up and the clearer waste will "eat" its way into the work, making lumps. The top clearer boards on all the roving frames will do the same thing if not kept clean. Excessive oiling of the top rolls will cause the oil to run out and gather fly and turn it loose in the work.

Failure to keep the flyers and tops of the spindles cleaned off, as well as the doffer boxes, will give trouble. The back plates on the steel roll stands behind the flyers, if allowed to run too long without cleaning, will cause trouble. The cleaning of this plate is determined by the hank roving, as the finer the roving the longer it will run without cleaning. In any case it should be done at least three times a week. On coarser work it should be done every day, according to the accumulation.

Another bad place for white lumps to accumulate is in putting roving up on the clear-boards for the front line of roving on the intermediates, or for fine frames, as the roving that is already in the creels is running down, passing by this roving laid on the front clear-boards, before going into the rolls, causes an accumulation of white fibers to stick out. Sometimes they get so large that they break down the ends before they will pass through the rollers. And if they don't break down they will become lumps or slugs. This can be avoided by not putting this roving up on the frames until it is about time to start creeling that which is being run out on the frames. Fanning off frames should *never* be allowed regardless of consequences, even for waste work, as this will cause it to run bad when it strikes the spinning, for the yarn is set for the travelers, or the travelers are set for yarn of a certain number, and when these extra slugs come along they will not go through.

All these things we had to work out, and work fast to be sure of making good on that order, and we got by fairly. But from then on we tried to avoid this overexertion by profiting by this experience—just like being bitten by the same snake twice, or a burnt child dreading the fire, for we didn't want to move, we wanted to stay on the job, and we didn't want the boss to get too peeved and sore, and we wanted his smile. To do so, we had to make good work. After all, it was largely a matter of good cleaning, and when a mill has a good system of cleaning, and the operatives get accustomed to it and see how much better everything runs, they like it much better.

Contributor No. 14.

Points on Brushing and Rolling.

Editor Cotton:

Some time ago, in a letter to the discussion department, I pointed out that there were not enough cloth room foremen taking part in the discussions, and for a while several of them sharpened their pencils and went at it, but it looks like the hot weather had proved too much for them and they have been nodding on the job. Therefore, I am going to take up one cloth room process and talk about it a little to see if it won't again start something going in

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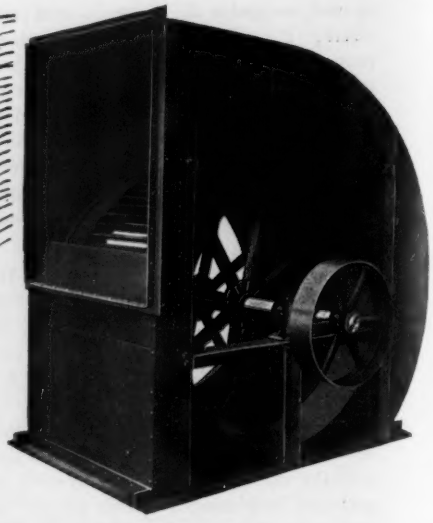

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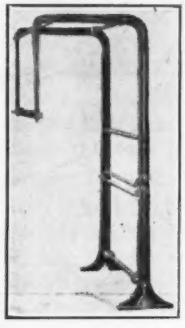
my line—that is, directly in my line.

After getting our goods properly stitched and wound on rolls the next process is usually a cleaning process, either brushing and shearing, or brushing at least. However, the character of the goods and the judgment of the overseer will have to determine to just what extent this shearing and brushing may be carried with safety and profit. Certain light goods of open construction such as scrim, mosquito net, very light bag cloth, etc., and others of heavier construction yet of softer weave, such as ratines, certain madras, lenos, etc., will allows no brushing at all in a regular brushing or shearing machine. Sometimes specially prepared machines, usually in connection with the inspecting frame and equipped with nothing but bristle brushes, are used to pick up loose strings, lint and dirt from such goods. Other goods of heavier pick and more compact weave will allow light brushing but will not stand the machines being set too close, else they, like the first mentioned, will be ruined by having the filling slip and the goods torn. While other goods heavier still and more solid in weave will allow the closest adjustment and the heaviest work.



In brushing, and also in shearing, the prime aim is to remove loose and hanging threads, gouts and leaf that have escaped in other processes. And there is often much of such foreign matter to be removed. The carder, spinner and weaver all have to be thankful for a good brushing and shearing machine, if properly run, and there is where the rub comes in. I will not venture to state a percentage, but many such machines in southern mills are improperly run and nobody seems to care. I have seen several such machines so run down, so poorly adjusted as to be a mere waste of power and time to run them at all.

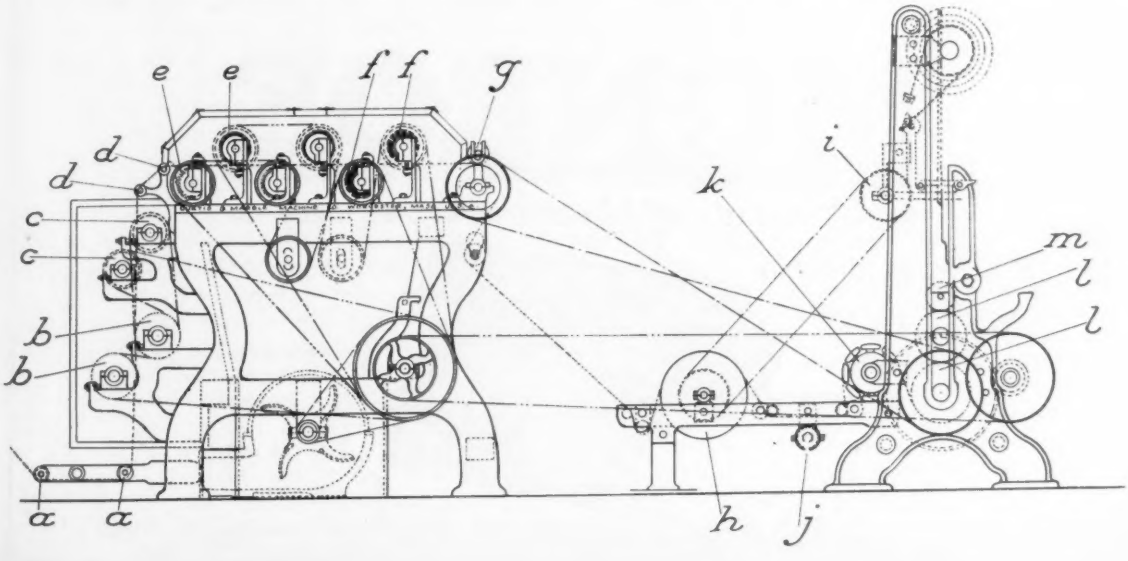
It is my purpose here to take up some of these defects and adjustments in detail, but before proceeding, allow me to say that these machines, like all others, have their limitations, and regardless of how well they are kept or how properly they are adjusted, they cannot be made to take out every piece of leaf and trash left by poor carding, nor every gout or knot left by poor spinning, spooling and warping, nor yet have I ever seen one that would take off every string left by poor weaving. These machines, if properly adjusted, will do much, but they will not do it all.

The first essential thing in brushing is cleanliness. I do not believe that any brusher was ever kept too clean, because the machines will run with the rolls all full of strings and waste if they are allowed to do so, forgetful of the fact that a roll covered with a blanket of strings never comes in contact with the goods and can have no effect upon them.

The next greatest abuse of these machines is speed, or more strictly speaking, unproportionate speed. Now on these machines, as those familiar with them know, there are two speeds, a roller speed and a cloth speed, or the speed at which the cloth passes through the machine. The roller speed cannot be too high, for the higher the speed the steadier and stronger the contact with the goods, the more often it operates on the goods in passing and, therefore, the more thorough the cleaning given. But while the rolls should run at as high a speed as circumstances and conditions will justfy, the cloth speed should be reduced and run just as slowly as possible. However, the goods can be made to go through quickly, as many mill managers seem to care more for cost than quality, the temptation to speed up the cloth is a temptation but few overseers can resist.

I present here for reference purposes a sectional view of an ordinary brushing machine with calender rolling machine measuring attachment, steamer and stretch roll. Such machines as this are usually used in our southern mills for ordinary sheeting. Personally, I prefer one with shear blades included. These machines are built by several manufacturers and may in some minor particulars be different but in principles and essentials they are all the same. I shall not try to deal with the differences but shall try to take up the essential features so that what I say may be made to apply to all makes of machines.

At the front end, or before the cloth enters this machine, I prefer to have a guide frame with tension and guide bars as illustrated in the small cut. The reasons for this



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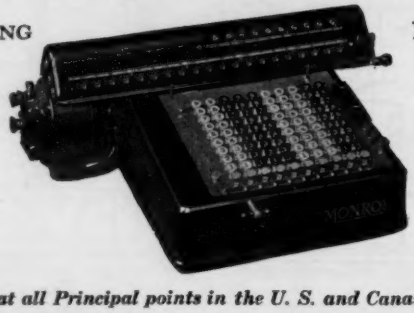

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are plain. It straightens any wrinkles, has the goods enter more evenly, allows the operator to see bad seams and such other places as will catch and tear on the brushes in time to stop the machine and save the loss of damaged goods, and perhaps breakage of the machine. Furthermore, it allows the operator to see wavy cloth and many other defects in weaving not possible to see otherwise. Such guide frames may either be purchased or built at a small cost by the mill mechanic.

After passing over the frame the cloth enters the brusher proper by passing around the iron rods *a a* and then follows the dotted line through to the calender rolls. It first passes between the emery rolls *b b*, one operating on the face and one on the back of the goods. These rolls are both valuable and dangerous and require more judgment in adjustment than possibly any of the other rolls. If set too far away from the goods they lose their value; if set too close they will slip the filling out of place on light goods and partially nap heavier goods, thereby changing its appearance, needlessly increasing the waste and rendering their prime aim of loosening up the gouts and knots so as to be more easily removed in subsequent processes more difficult. These rolls should be set so as strike the goods with a good even snappy stroke of the same force on either side and with even tension the entire width of the goods.

Another important feature is to keep the rolls properly covered with the right size emery flakes suitable for the goods to be finished. Some may laugh at this idea and I do not remember ever having read anything along this line even from the manufacturers themselves, but I have found by experience that by using a fine grain fillet much better results may be obtained on fine goods; also a coarse grain will give better results on coarse goods. Also I wish to say a word about replacing the emery on worn rolls.

Two abuses are a common practice: One is to entirely discard old rolls and buy new ones; and the other is to try to put new fillet on top of the old. One is an unnecessary expense and the other unsatisfactory, as the emery flakes never form an even surface, but lump up, so to speak. The rolls usually come covered by a winding of coarse strong twine. To properly recover, take this twine, old fillet and all, off down to the bare wood. Then rewind with the same or similar twine laid in a good grade of glue. Let it dry, place it in a lathe and cover first with a heavy coat of good slow drying glue. Then, while wet, start the lathe at a reasonably high speed and spinkle emery on it as long as it will stick. Allow it to run for some time until the fillet is settled, and then lay it away on journal supports until thoroughly dry.

Our cloth now comes in contact with the beater blades *c c*, arranged as the emery rolls, one on each side of the goods. These blades are also an important part of the machine which are often misused or abused concerning their proper setting. Just about the same may be said of these as has been said about the emery rolls, except that I prefer to set the beater blades just a trifle closer than the emery rolls, if the goods will allow it. I prefer to set them thus with the goods drawn taut. I turn the blades to right angles and then set them so that one cutting edge is just striking the goods as the other is just leaving. By taking a little care and getting this adjustment just right, we may have two cutting edges at work on the goods all the time instead of one. And this is no trifling matter, although few overseers seem to realize how much value these little blades are to the mill when properly adjusted. The amount of leaf trash, dirt and knots they will cut off the face of the goods, even when the carding is of the best, is simply marvelous. The abuses of these blades are improper setting, allowing them to become foul with strings, which they very easily do, and dullness. The value of these blades lies in keeping them sharp. The best way to sharpen them is by milling or planing, but as few mills are equipped with suitable machines to handle material as long as the rolls usually are, fairly good results may be obtained by taking the rolls out, fastening them in a lathe or some other suitable device and drawing a very fine file down each blade, a corresponding number of times—draw-filing is, I believe, the proper term for this.

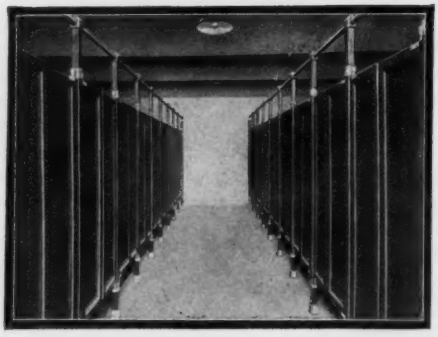
The goods now pass up over bars *d d* and between wire fillet covered rolls *e e*. Because of the very heavy drag at this point, if the goods are very light, I prefer to change lower *e* and substitute a bristle clothed roll. My reason is because the heavy pull, owing to the sudden curve of the goods here, makes it necessary to set this lower *e* roll too far away from the goods or else cause an abnormal amount of waste by the roll hanging into bad seams and weaving imperfections. With heavy coarse goods, this, of course, does not occur so often. The next two rolls in this particular machine are also usually wire fillet, so I have left them out, but what I now say of wire fillet will also apply to them.

There is a wide range of fillets in use on these rolls and it would be difficult to say which is best to use save in a general way. The fillet should be of proper gauge and have little or no knee, that is, be almost or quite straight. If any knee or crook exists it should be run point away from the goods and not point to it as is so often done. When it is run point to the goods, a more or less napped effect is bound to result. On goods that will stand this nap, no nap is desired. Goods of a soft texture that might not be hurt by a slight nap will, as a usual thing, catch on the rolls and tear because of their very softness, so that these rolls will have to be run so far away from the cloth as to be almost useless, or tear and waste too much cloth.

Personally, I prefer for coarse heavy goods a very short coarse fillet, perfectly straight. For medium weight solid weaves I prefer a long fine fillet, and for very light loose weaves, I substitute stiff bristle brushes entirely.

As to setting for coarse heavy goods with a short stiff fillet, I would set my rolls to strike evenly but lightly with little or no drag. Where I use long soft wire I would set so as to have considerable drag. The abuses of these rolls are in allowing them to run foul with strings and waste, wrong settings, improper fillet, badly worn fillet, substituting discarded card fillet with too much knee and running them too sharp. These rolls are very difficult to keep clean. Strings will bury up in the clothing and give no little trouble to get them out. The best way I know to clean them is to use a good sharp knife, strip the roll down lengthwise three or four times, then, with a sharp-pointed crooked wire fixed to a handle, pull the threads away. These rolls require little or no sharpening. There is an emery-covered board with irregular grooves on its face sold for this purpose when sharpening is necessary.

We now pass to the rolls *f f*, which usually are stiff bristle brushes, whose prime purpose is to clean the cloth



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of loose dirt, strings and lint that the former rolls have left upon it. They should be set to drag fairly well but not too strongly upon the goods and with an even force the entire width of the goods. The most important thing is to keep them clean and in this respect let me say that one of the hardest things I have encountered in connection with these machines is to get the operator to keep the stripping box for the top roll clean. This box will fill with lint and stringe very rapidly and when too full this lint will be drawn down by the force of the fan underneath and pass out of the machine in great lumps on the goods. Having more or less starch in it, this lint will be moistened in subsequent processes, adhere to the goods, pass on into the bale, and probably be heard from through the buyer.

I have referred to the settings for these rolls. The means of setting is so patent I hardly thought it necessary to go into detail about it. All boxes for the journals of the rolls are made adjustable by a very simple mechanism that anyone may readily understand.

Our goods are now through the brushing machine proper and ready for subsequent processes. The brushing machines are fitted with quite a variety of winding devices. I show, in connection with this brushing machine, the one in most common use in southern mills. It is a rolling device and calendering machine combined, which is in reality another process. Yet as it is a conservative and economical arrangement, I give it preference to all other forms of rolling or winding goods from the brusher. In fact, my preference is to have the stitcher, brusher and winder all arranged in tandem and the shipper rod on the brusher and calender extend back to the stitcher so that one operator may run the entire line. By this means I am able to save one man's pay and if not, then by all means, I am sure to make the work convenient and reduce the waste to a minimum.

After leaving the bristle rolls *f f* the goods pass onto the draft roll *g* with a heavy iron nip roll, gear driven, on the end of which is an expansion pulley that may be adjusted to suit the various goods and needs. From here the goods pass on down under the rolls and over the measuring roll *h*, which, by a belt with an expansion pulley for adjustment for various goods, drives a register *i* on the frame of the calender.

This measuring roll serves a number of purposes. Where goods are packed for shipment in rolls it, or some similar device, becomes an absolute necessity. By running each style of goods on separate rolls, as most overseers do, and measuring and weighing the rolls, the average weight may be ascertained much earlier and just as accurately as by waiting for the baling slips when the goods are packed, which is sometimes days after the cloth has been brushed. Then, again, I claim that a more accurate estimate of how the goods are really running at the looms may be obtained thusly. The goods when passing here have all been woven recently, while if allowed to pass on through to the packing slip, some of the goods in the bale or case may have been woven days or even in some cases, weeks before. The older goods may have been, when made, too heavy or too light. This will show on the packing slip average and may cause the superintendent to change his yarn, when, in reality, the goods are running right at the present time. It is just another check on the weight and one a little more prompt in its application.

Still another value of the measuring roll worthy of mention is that by keeping a record of the yards run, the overseer is able to ascertain in a jiffy how much goods are unpacked in the room. The process is simply this: Take the inventory figures for a single style or for all the styles collectively as per the last inventory, which is usually the first of each month. Add to this inventory figure the amount of goods brushed, subtract the amount baled and you have the amount on hand much more accurately than a laborious inventory would give it to you and much more quickly. In mills running a large number of styles of goods on short orders, this is about the best way I know of keeping up with how you stand on orders and from this cause alone justifies the cost and careful upkeep of this roll.

From the measuring roll the goods pass on over the steam jet *j* where goods for the jobbing trade, such as sheeting, shirting, etc., intended to reach the ultimate consumer without any further finishing is usually steamed. This steam jet is connected with the shipper lever in such a manner that when the rolls *l l* are running and winding the cloth the jet is open and moistening the cloth by blowing moist steam through it just before it goes onto the stretch roll *k*. This moisture makes the cloth stick slightly to the outwardly moving bars of the stretch roll, which pulls out all wrinkles and even increases the width of the cloth to a slight extent. From this point the cloth goes to the nip of the calender rolls *l l* and after passing through this nip it goes up over the shell roll on the mandrell *m*, where it is wound in roll form under a suitable brake tension.

I have added these latter details solely for the benefit of the younger readers, as the more experienced men understand all this without being told.

Also, I have not gone into the use of heat and pressure and slip on the rolls *l l* because such finishes are not used on grey goods but usually come into play only after other processes or in the case of colored goods.

Perhaps some cloth room man more familiar with this angle of the work will now come to bat and tell us his views on his particular class of goods. We're waiting and we'll be interested, too. T. T. M. (N. C.)

Naphthylamine and Beta-naphthol.

Editor Cotton:

Will you please tell me through your "How Other Men Manage" department what naphthylamine and beta-naphthol are derived from. I know in a general way that they come originally from coal tar and that they are used in aniline colors and dyeing but I have no definite information regarding their mode of making or their uses in the production of dyestuffs, though I am familiar with the use of the finished product, being a dyer.

I. F. McC. (N. B.)

Editor Cotton:

Replying to "I. F. McC.'s" inquiry, I would say that naphthylamine is derived from naphthalene, one of the constituents of coal tar.

When coal tar is distilled the result of the distillation is separated into four fractions: 1st, the light oil, which passes over up to 150 degrees Centigrade, and which contains all the benzene and toluene; 2nd, the middle oil which

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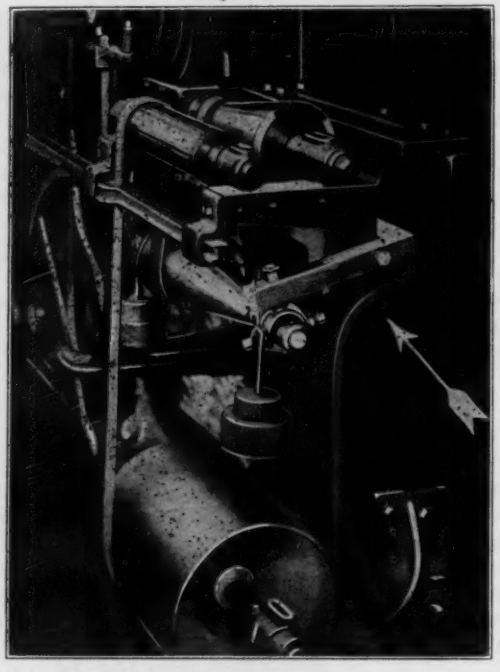

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passes over from 150 degrees Centigrade to 200 degrees Centigrade, consisting of phenol, and naphthalene; 3rd, the heavy oil which passes over from 200 degrees to 310 degrees Centigrade, consisting of naphthalene, phenols, and quinoline bases and, 4th, the anthracene oil which contains anthracene.

After distilling, these four fractions are further purified by washing and further distillation.

Naphthalene is deposited from the fractions which pass over between 180 and 250 degrees Centigrade, and is purified by first pressing, then washing with alkali and acid (if necessary), again pressing, and finally subliming or distilling. This naphthalene is the first product or starting point from which napthylamine and beta-naphthol are made, and I might say here that it is also the starting point for the manufacture of artificial indigo, the naphthalene being converted into phthalic anhydride by distilling with fuming sulphuric acid in the presence of mercury.

When making beta-naphthol from naphthalene, the first process consists in converting the naphthalene into naphthalene B sulphonic acid. This is accomplished as follows: 100 parts naphthalene, 120 parts concentrated sulphuric acid. The acid is warmed to 100 degrees Centigrade and the finely ground naphthalene is added gradually under constant stirring. The mixture is then heated to 160-170 degrees for 12 hours. After cooling, the sulphonation mixture is poured into boiling water and milk of lime added until an alkaline reaction is obtained. The mixture is at once filtered and evaporated down to a small bulk and allowed to cool. After standing overnight the calcium salt of the sulphonic acid crystallizes out and is filtered. It is now dissolved in hot water and a solution of carbonate of soda added until a filtered portion gives no further precipitate with sodium carbonate. The precipitated calcium carbonate is then filtered out, and the sodium salt evaporated until crystals begin to separate out.

This resulting sodium-naphthalene B sulphonate is converted into beta-naphthol as follows: 100 parts sodium naphthalene B sulphonic acid, 300 parts caustic soda; the caustic soda with a little water is put into a crucible and heated to 280 degrees Centigrade. The finely powdered B-salt is now added as quickly as possible with constant stirring, taking care that the temperature does not fall below 260 degrees Centigrade. When all is in the temperature is raised to 320 degrees Centigrade. The reaction takes place at 310-320 degrees Centigrade. The mass froths and steam is evolved and when the reaction is all complete the mass becomes quite liquid. This fusion is kept at 310-320 degrees for five minutes. The top layer of the melt, containing the sodium naphtholate, is poured off, and, after cooling, the mass is broken up and dissolved in water; from this the naphthol is precipitated with concentrated hydrochloric acid. After cooling the beta- naphthol is filtered off, dried and distilled *in vacuo*. Beta-naphthol is used largely in the preparation of azo—and other dyes, and in the dyeing of the insoluble azo—and ingrain colors on the fibers.

In the production of naphthylamine the naphthalene is first converted into nitronaphthalene by nitration with: 100 parts naphthalene, 80 parts concentrated nitric acid and 100 parts concentrated sulphuric acid in the same manner that nitro-benzene is made.

Nitro-naphthalene is a light yellow solid and is used almost entirely for the manufacture of naphthylamine. Naphthylamine is produced by the reduction of nitro-naphthalene with iron and hydrochloric acid. The process is as follows: 60 parts nitro-naphthalene, 80 parts iron powder, 4 parts concentrated hydrochloric acid, 40 parts water. The iron powder, together with the water and the acid, is warmed to 50 degrees Centigrade. The nitro-naphthalene is now added in small portions at a time with constant stirring. The temperature throughout the reduction must be kept at 70-80 degrees Centigrade. When the last portion of the nitronaphthalene has been added, the stirring is continued until there is no further rise in the temperature; when this point is reached, the reaction is finished. A little milk of lime is now added until an alkaline reaction is obtained and the mass is allowed to cool. It is now filtered and the iron residue containing the naphthylamine is dried as far as possible in the air. After partially drying in this manner the residue is distilled. The naphthylamine distills over and soon solidifies, the cake is dried and redistilled *in vacuo*. Naphthylamine is nearly insoluble in water but it dissolves almost completely in dilute hydrochloric acid. It is sold in greyish white lumps and is used for the preparation of naphthionic acid, alpha-naphthol, naphthylamine-sulphonic acids and many of the azo dyes.

Beta-naphthol and naphthylamine are used as component parts in so many of the dyestuffs that I have no room here to give them all and so will mention only a few:

Fast Brown—Naphthionic acid + Resorcinol.

Naphthol Black—Naphthylamine disulphonic acid + Beta-naphthol disulphonic acid.

Brilliant Congo Red—Benzidine + Naphthylamine sulphonic acid.

Benzo-purpurine—Tolidine + Naphthylamine sulphonic acid.

Azo-blue—Tolidine + Naphthol sulphonic acid.

Benzo-azurine—Dianisidine + Naphthol sulphonic acid.

Diamine Black—Benzidine + Amidonaphthol sulphonic acid.

Naphthylene red—1:5—Diamidonaphthalene + naphthionic acid.

Beta-naphthol is used in dyeing all the so-called ice colors and it is used in most of the diazo dyestuffs. Nearly all the azo dyestuffs (and there are about 800 of them of all colors) are produced by the interaction of a diazo salt for the first component and a phenol (beta-naphthol) or an amine for the second. In the first case the aqueous solution of the salt (hydrochloride) of a primary amine is first treated with sodium nitrite and hydrochloric acid in the presence of ice, whereby a diazo salt is formed. This solution of the diazo salt is next coupled with the phenol (beta-naphthol) by allowing a solution of the former to run gradually into an alkaline solution of the latter.

In the second case where the second component is an amine, the principle of the method is the same, except that the combination of the diazo salt with the dissolved amine is brought about in a neutral or faintly acid solution.

W. B. (Maine)

The 1923 edition of Dockham's "Jobbing Trade and Department Stores Directory" is ready for distribution. This edition contains a list of 4,321 buyers, including 3,084 jobbers and 1,428 department stores, located in the United States and Canada. Dockham Publishing Co., 44 Bromfield St., Boston, are the publishers.

Colored Goods Men, Attention!

EDITOR COTTON:

I should like to have some of your readers running colored goods give some suggestions for methods of preventing frosting, or white spots on colored warps, at the slasher. R. G. S. (Ga.)

Answers Questions on Slashing.

EDITOR COTTON:

I should like to reply to the questions on slashing, as given in the questionnaire of the Textile Operating Executives of Georgia, which was published in your August issue.

The first question asks what percentage of size is best for good running work. I should say from 5 to 20 per cent. It all depends, however, upon the number of the yarn, the twist in the yarn, the number of threads per inch in the reed, the picks per inch, whether plain weave one up and one down, or plain weave with two threads in one harness eye with four threads in one dent of reed; also whether it is three-harness drill or twill or sateen weave; and whether the yarn is dyed. There are also many other little points to be considered.

Question 2. "What percentage of increased strength can be gained by using ball bearings on slashers? Is the positive driven slasher (this should read "cylinder" as to my mind "slasher" means the whole machine) better than the ball bearing cylinder, for strength of yarn?"

In answering this, I am in doubt as to the meaning of the word "positive" as used in the question. On ordinary slashers with roller bearings, and running sets such as print cloth warps and other heavier sets, there does not seem to be much, if any, strained or weakened yarn from these sets pulling on both the big and little cylinders; that is one kind of "positive" (pull). Next, take the same machine and put a positive gear or chain drive on the large cylinder, and this would eliminate some so-called strain. My choice would be ball bearings on both cylinders, no chain drive, unless where the sets were so light that they could not pull the large cylinder laced up alone.

The less stretching the yarn receives in sizing, the better it will be on the looms, but the large cylinder should not run as if it were on centers, so that when the machine is stopped suddenly the cylinder will keep on revolving when the yarn is stopped. To my mind, there is quite a lot that can be done to prevent weak yarn on slashers besides ball bearings. For instance, if one changes from a heavy set to a very thin set and does not arrange the cloth; that is, take enough cloth off the tension roll to make the right tension on the yarn, there will be stretched yarn, no matter how the cylinders are driven.

It wou'd seem that the best answer to this question would be individual tests, always keeping in mind that good yarn spoiled in slashing is entirely up to the one in charge of that department. The fault or blame should not fall on the operative, unless he has been hired with the understanding of full responsibility.

Answering question three, I think thin boiling starch is better than thick boiling starch, for the reason that it more thoroughly penetrates the yarn, but the formula must be strengthened to suit the numbers of yarn and different weaves.

"How long should starch be cooked before using, and at what temperature?" asks question four. This question will have many varying answers. My suggestion is: after boiling hard for a few minutes, leave small steam jet on and keep just on the boil for an hour and a quarter.

Answering question five, I have always tried to get the best all-wool blanket, not too heavy, with a medium close weave, for the finishing size roll. A mixed blanket is good enough for the back size rolls on coarse work, but on fine yarns, covers of the best quality are essential.

Question six asks whether slashers should be run at high speed with additional steam pressure, for drying yarn, or slow speed with low steam pressure, to obtain best percentage for added weight.

In reply to this, size should not be too thin. The machine should be run slow enough to get the desired penetration and percentage of gain. The length of time the yarn remains in the size will determine what weight one gets. I wou'd use drying power enough to make the yarn okeh for the loom.

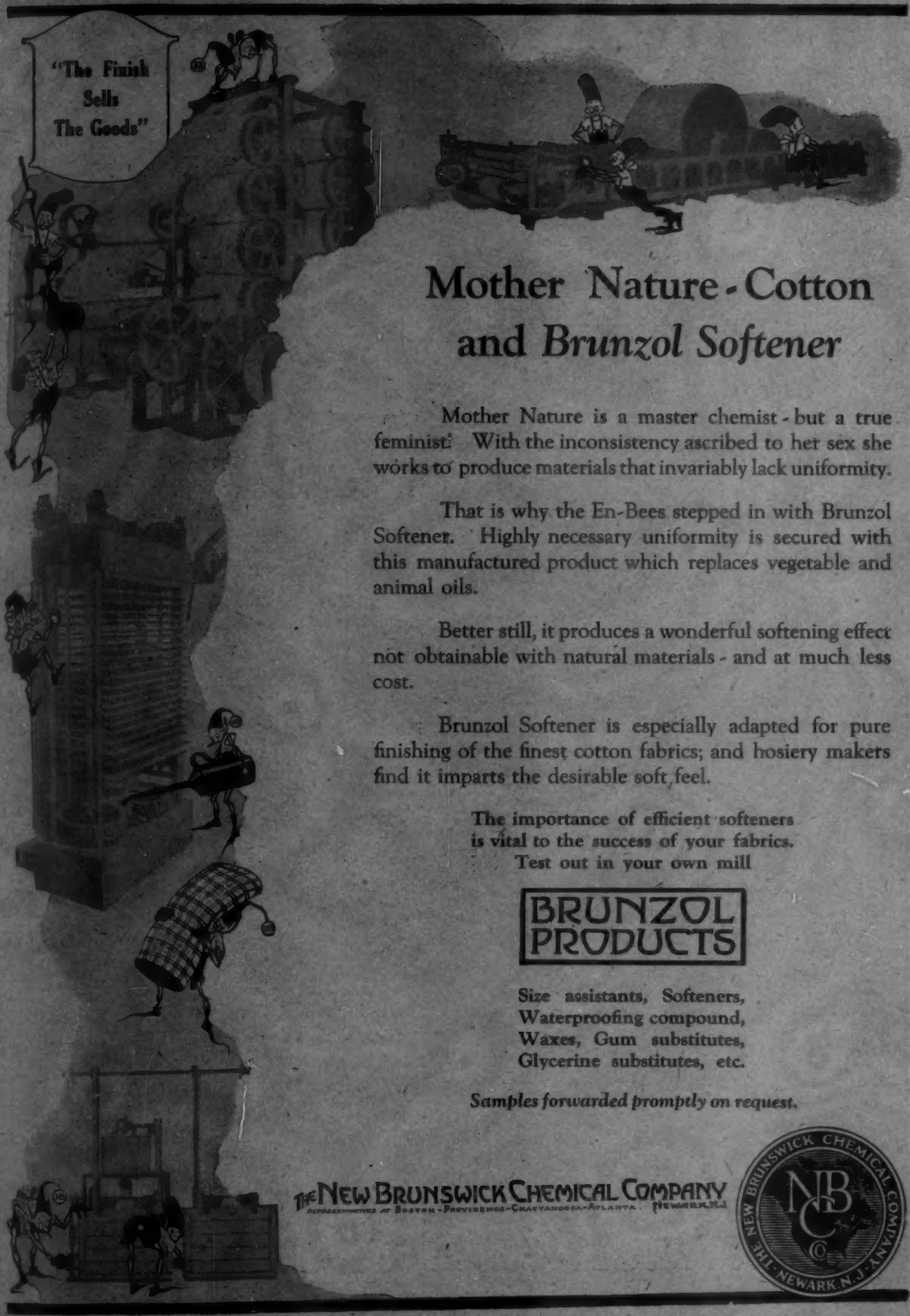
As to the temperature in the size box—question seven—I keep it at a bubbling boil.

Question nine asks, "Do you run a lease roller between your size box and the first cylinder? What do you think about it?"

From experience—I don't *think* anything about it—I was *convinced* long ago that the sheet of yarn should not be disturbed in any manner whatever after coming from the size rolls until it reaches the rods in front. I have found that by placing the beams different from the usual manner I get the result desired with the roll mentioned in the question. As I understand it, this roller is for the purpose of making the two halves split easier at the front.

As to the amount of soft waste on section beams—mentioned in question ten—this depends very much on the judgment used by the slasher man in setting his beams correctly, and in noticing how they act as to tension at any time he stops the machine. One can see if a certain beam or beams are too heavily weighted or too light, they should be adjusted accordingly. There will always be some soft waste. As to the percentage of hard waste, one can make nearly all the slasher waste into hard waste, whichever will bring the best price, or it can be all taken off as soft waste except the tail-end at the beginning of the set and the most of that should be put on the bottom of the first loom beam and would take the place of an apron. By doing this, good yarn could be woven up pretty close to the lease rods at the loom. If all hard waste is desired, run the set completely out except enough to tie the next set onto. However, I think it best to run some distance after the last cut mark or after the first section beam has run off, as one can better doff loom beams before the knots on the new set come over the tin roller.

Question eleven asks for remedies for slack threads on the section beam behind the slasher. These things might occur one time in the best managed mills, and can be taken care of for one set, but to have them happen repeatedly is out of the question. Slack threads at the selvages are caused sometimes by the comb or beam having moved after being set right, supposedly. If the slack ends are scattered they may be the result of heavier yarn getting mixed in the spooling, or they can come from an old lot of the supposedly correct number which is heavy by two or three numbers. A good second hand or overseer should be able to detect at a glance, at the warper, yarn that is a few num-



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bers off, and also see whether the comb and beam are set all right. Also he should examine the creel when the warper stops and see if there are not a few spools running too freely, caused from very pointed pegs or for any other reason.

"What weight squeeze rolls do you use, and why?" asks question 12. I use a 600-pound weight, because they were on the machines, and I believe the weight of the rollers is of no more importance than covering correctly. The cushion plays a very important part as to whether more or less size is left on the yarn.

"Which will give the best results, to agitate the starch and compound in cold water before turning on the steam, or to turn on the steam as soon as the starch and compound are put into the kettle?" asks question 13. I believe that the best results are gotten by first souring or steeping the starch in cold water and then pouring it through a fine sieve into the size kettle, which already contains the proper amount of cold water. If a powdered gum is used it can be dissolved like the starch and put in at the same time. All greases, oils, or softeners should be dropped into the kettle when the size is hot.

As to methods for preventing rust spots on slashers, asked in question 14, I would say look out for all drips from the hoods, wash the size box out thoroughly as often as possible. If washed out any night or on Saturday always leave it full of water. Boil up in the morning, run the water off, then wipe clean all iron journals or supports in the box. Contributor No. 44.

Getting a Full Leathery Feel on Drill.

Editor Cotton:

I am enclosing herewith a sample of sulphur dyed khaki, 37 inch, 2.75 yard drill and would greatly appreciate a reply through the "How Other Men Manage" department, giving a formula for producing that full clothy "feel" as per sample. I am anxious to produce a full leathery "feel" as the feel is the important object.

C. K. (Wis.)

Editor Cotton:

In reply to "C. K. (Wis.)," who asks for formula for finishing his 37-inch, 2.75-yard drill so that it will be "full and leathery," I would suggest that he try it somethink like this:

Corn starch	150 pounds
Glucose	50 pounds
Epsom salts	50 pounds
Monopole oil or soap or Turkey red oil	20 pounds
Water to make	100 gallons

Boil until thin, or about one hour.

The goods must be dried after dyeing and then be allowed to cool before starching in the mixture given above. Starch on a three-bowl starch mangle giving two nips and medium set and dry slowly at a low temperature on the cans.

After drying let the goods lie until cool, and then damp on the sprinkler thoroughly, allow the goods to lie for two hours and calender on calender with wood rolls, which rolls must be lapped with cloth, preferably slasher cloth. The goods should be run over a revolving stretcher set in front of the calender so as to soften them up, or "breaking them down," as it is called by the trade. The goods are of course run cold.

There is another way that answers very well: A mixing containing two pounds of starch to each gallon of water is first made and boiled, one to one and one-half hours, until thin. The goods are run through this on the starch mangle and then thoroughly dried on the cans. They should then be run a second time in the same starch mixture to which has been added—for every 150 gallons of it—

Epsom salts	100 pounds
Turkey red oil, etc.	20 pounds
Chloride of zinc (100 degrees Tw.)	15 gallons

Pass through this on the mangle, and dry, cool, sprinkle, etc., as previously advised.

I am inclined to favor the first method or some modification of it. In either case, the goods should finish full and leathery and should have gained considerably in weight. I might say that Glauber's salt will answer in the place of the Epsom salt, but I think the Epsom the better of the two. Epsom salts enter the fibers of the cloth when wet and expand there when dried, thus making the goods feel thicker. W. B. (Maine)

Labor Turnover and Employment Methods.

Editor Cotton:

I wonder how many operating executives have given serious thought and investigation to the amount of labor turnover in their plant or room, its cost, and a study into the methods of lessening it? The problem of inducting men and women into industrial positions where they will fit with securing permanency in the working force, is no longer a simple one.

In twelve factories of one of the largest companies in the country manufacturing power it was found that 73 per cent of the employees engaged during the year had not worked there before, while 23 per cent had worked there at some previous time or other.

The reasons for this are many, and may be due in part to the employer and again to the employee. On the part of the employer the causes may be in low wages, bad working conditions, failure to protect the worker from accidents, a bad attitude on the part of the foremen or superintendent toward the employees. On the part of the worker reasons will be found such as incompetence, insubordination, laziness, a general roving spirit, and lastly accidents, sickness and death.

It is generally conceded that the cost of hiring and training new workmen is considerable. It is not known how great this expense may be nor the detailed losses involved, which include interviewing new men, medical examination if required, investigating applicants and sources of labor supply, instructing the new men in regard to their duties and general factory rules, etc., the wear and tear on machines by the unskilled workmen, and the reduction in production due to the unfamiliarity of the men with the work and the machines causing spoiled work and making a great deal of waste.

It is not an easy matter to obtain correct mathematical data of this total cost, due to the fact that it varies with the kind of work, and the character of the workmen. Some

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very good average estimates, however, have been obtained, and it has been found that it costs around fifty to one hundred dollars for each new employee.

From this it is readily seen that it would pay to reduce this labor turnover to as small a percentage as possible, and among the many remedies suggested are improved methods of hiring and discharging men, facilities for training them for their new duties, reducing fluctuations in the volume of work, offering financial inducements, medical supervision over sickness and accident, and a humane interest in the worker himself.

It is generally conceded that it is a good administrative policy to have as few functions performed by one man, as possible, and the problem of hiring men is no exception. In small plants this is most always looked after by either the foreman or the superintendent but in plants of 300 or more employees, this work should be taken care of by one man. One who can devote his entire time to the problems of employment. A great many modern plants are now handling these problems through an employment office and under the direction of an office manager.

His primary duties being that of developing sources of labor supply, examination of applicants for positions, and to select the right men to fit the needs of the factory, to inform the men what is their duty and what is expected of them in the factory.

His secondary duty would be to make a study of the plant conditions as affecting the workmen, which would include methods by which men are introduced to their work, also any conditions that work against a spirit of cooperation between the men and the management, which include such as the treatment of the men by their foreman, hearing complaints and grievances, methods of promotion, transfers from one department to another, adjustment of wage rates, and to examine every case of discharge or other causes of leaving. He also may supervise the welfare work, including medical supervision and accident prevention.

In a plant of 300 men, considering 100 per cent labor turnover, an employment manager, reducing this to a 20 per cent basis, and at a conservative estimate of $50 a replacement, can save $10,000 yearly aside from the many other benefits resulting from a stable working force. Of course the hiring of two or three men a day would not keep an employment manager busy, but the taking over of the preliminary instruction, accident prevention and welfare work, around the plant, will keep him properly engaged.

A great deal can be written on welfare work and the enormous amount of good it embraces, for the benefit of the worker as well as to the employer, who gains through the lessening of labor turnover in his plant, but I feel that enough has been written this time under the foregoing title.

K. (O.)

Draft on Pickers.

EDITOR COTTON:

Will you ask your readers to give their opinions of draft on cotton pickers, with reference to making an even lap?

J. D. (Maine)

Attend Boston Textile Show, Oct. 29-Nov. 3.

The Reduction of Manchinery in Yarn Manufacture.

Editor Cotton:

From time to time there has appeared in the department of "How Other Men Manage" accounts of the elimination of certain repetition of processes. This is usually centered around the argument of whether it is best to omit the intermediate pickers. These experiments are really capable of much more elaboration than has heretofore been generally realized. The recent severe competition resulting from the passing of the boom days has forced some mills to again investigate the problem of reducing costs by eliminating certain machines or processes. Then, too, all progressive manufacturers are interested at all times in finding out if there is any place in their mills where some saving can be accomplished.

Dispensing with the intermediate picker may alter the strength, cleanliness and evenness of the finished yarn. Those who have done this claim that in most cases none of these factors have been made worse and in some cases they have been improved—notably the strength. The primary purpose of the pickers is to clean the stock and put it in such shape that the cards may act on it properly. The finished laps should therefore be clean and even. There is no question but that two pickers working perfectly will be much better than three pickers working imperfectly. As has been pointed out in some of the contributions to this department of Cotton, installing ball bearings on the apron bearings, patent swings for the evener belts, and a general trueing up of the whole machine, will render two pickers fully capable of making as good or perhaps better laps than three pickers. Certainly the less the stock is handled by the violent action of the beaters, the better the strength of the finished goods. If the finished laps from two picking processes show up to be fairly even and the cleanliness is satisfactory, it is foolish to continue operating three picking processes.

The next opportunity for investigating the feasibility of dispensing with a repeating process is the drawing frames, since few mills resort to double carding to secure cleanliness. The sole purpose of the drawing frames is to parallel fibers and even up the roving. Any drafting operation tends to parallel the fibers to a certain extent. Therefore, the machines following the drawing frames are, in a measure, completing the work of the drawing frames. It is apparent that if the cards are delivering a fairly even roving all over the card room, and the drawing frames are always kept in good operating condition, there is a possibility that even one process of drawing may deliver a sliver which will produce just as good yarn as had heretofore been produced with two processes of drawing. Certainly it is rare that anything is gained by three processes of drawing.

Roving frames are usually limited to three processes. These frames may be investigated in the same manner as the machines preceding them to determine the effects of discontinuing one or more of them. It must be borne in mind, of course, that the question of length of draft comes in here. When a roving frame is omitted, the drafts on the remaining frames must be increased or the sliver from the drawing frames lightened up.

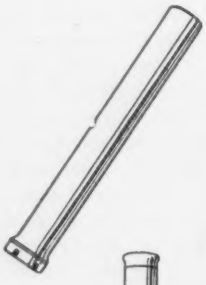
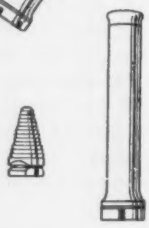
It will have been observed that the writer has spoken in very general terms and has left a great deal to the judgment of the superintendent who proposes to investigate reducing his costs by reducing machinery. This experiment naturally must be limited by the character of yarn being made. Extremely fine yarns do not lend themselves to the problem so well as coarse yarns. However, mills spinning coarse numbers should by all means investigate this most important problem. The writer feels sure from what has already been written, and experiments personally witnessed, that the field offers very fruitful results. These problems must be entered slowly, using only one machine at a time for experimentation. They cannot be gone into rough shod. The test room must be relied upon for determining the effect on strength and evenness. These tests should not be limited to the finished yarn, but thorough tests should be made on laps, sliver and roving. The cleanliness and appearance of the finished yarn should be carefully inspected. With patience and care results should be obtained in any class of manufacturing establishment. Coarse yarn mills or mills weaving from their own coarse yarns offer the best field for research on this point.

The writer recently visited a mill which was exceedingly successful in reducing costs and improving the strength of their finished goods by eliminating the repetition of processes. This mill used two picking processes, one drawing process, and delivered the drawing sliver directly to the speeders. Of course the drafts on the drawing frames and the speeders were increased. The drawing sliver was about one-half its previous weight. The finished yarn showed up to be stronger and just as even as it had been in the past with the usual layout. This is mentioned to show the tremendous possibilities of this proposition. The writer does not think that most mills can carry things this far, but there are certainly a great many mills who can equal this in reducing processes or approximate the mill which has been mentioned.

Our textile industry was inherited from England. The conservatism of the English is proverbial. In England it is said that practically all mills adhere to three picking processes, three drawing processes and four roving frames. It is true that the English mills average a finer count than the American mills and this may warrant this extensive processing. However, because one type mill may require such a layout, it by no means follows that another mill should also require the same layout.

The writer has had a superintendent of a large mill, belonging to a very successful corporation, tell him that he never experimented. This man stated that when anyone came to him with a new idea or a new machine, he invariably told him that he let the other fellow do the experimenting and then, if these were successful, he would adopt them. If this superintendent really knew how little these remarks sounded he would have never uttered them. Not that mill men should tear up their organization and their mill by any fool thing suggested to them, but certainly they must realize that all progress is first an experiment.

There is such a thing as conservative research or careful experimentation. Any mill to go forward, becoming larger with business in general, must continually experiment. The textile industry is not like the automobile industry in which the struggle for existence and profits means constant research. A product of an automobile factory becomes obsolete almost as fast as women's styles. Conservatism has no place in this industry. The products of

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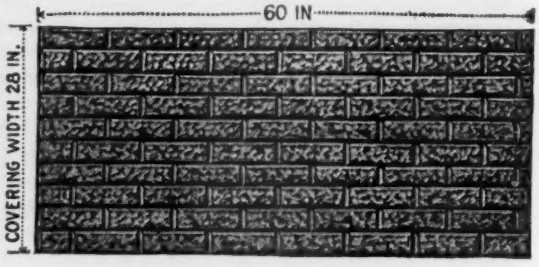

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the textile mills in the unfinished state vary but little, yet there is always that constant struggle for reduction in costs. Here is where the major portion of research is required. For any mill man to say that he wishes the other fellow to do the experimenting, is to say that he wishes the other fellow to eventually get the business.

Contributor No. 323.

Suggestions on Power Cost Reduction.

Editor Cotton:

One of the most important points in the management of cotton mills—and in many mills one that is given too little attention—is the saving of power. Certainly this important factor is not given the consideration that it deserves. Power is the backbone of the mill and is one of the items of expense, and anything that can be done to decrease this expense is very worthy of consideration. In this article I give some causes of high power costs and offer a few suggestions which I hope will be helpful to those interested.

The first and the two most important factors which will be considered in reducing power costs are oiling and cleanliness. A regular system should be laid out in oiling and cleaning textile machines, and this system should be followed. It is just as well not to have a system as to have one and not follow it. In large mills there is generally a man who attends to the oiling and nothing else, and this is to be recommended in every case where it is practical to do so. Each machine should be oiled at proper intervals and this can best be ascertained by experience. To keep the oil from spreading over the machine a small piece of waste should be used to wipe over the oil hole. The proper kind of oil to use is another important point. And a sufficient number of grades of oil should be kept on hand, but it is not well to have too many grades, as the expense of handling and storing them would not justify their use. The hangers should also be kept well oiled. All machines should be kept as clean as possible while in operation by the operatives, and should be taken down at intervals (length of time depending upon the machine) and thoroughly scoured and cleaned. A clean machine not only saves power and waste, but also adds to the appearance of the room and the health of the operatives.

Old machinery also requires more power to drive, and whenever possible should be replaced by new and up-to-date equipment. Roving frames with the old-style horsehead motion require much more power than the new frames with the vertical shaft.

Another common cause for high power costs is that the shafting is very often out of line. This creates more friction and requires more power to drive. Shafting in the mill should be inspected often and kept on proper alignment. Self-aligning hangers should be used if possible. The machines should also be set in proper alignment and level. If, for any reason, a machine is not in use it should never be allowed to become rusty. A good way to keep machines from rusting is as follows: take an ounce of camphor, dissolve it in one pound of melted lard; take off the scum and mix with as much fine black lead as will give it an iron color. Clean the machine and smear it with this mixture, and after twenty-four hours rub clean with a soft linen cloth. Vaseline will keep polished surfaces from rusting better than anything else. Sometimes it is very hard to remove rust from certain parts of machines, and if the machine is allowed to rust it often means that new parts will have to be ordered.

In placing and changing gears on machines they should never be set too close. Setting them too close not only requires more power but causes a grinding noise and reduces the life of the gears. Tight belts also require more power but they should not be too close as slippage means a loss of power. Too much weight on top rolls requires more power—just enough weight should be used to properly grip the fibers. Ball bearings and shell rolls mean a great saving in power and should be used wherever possible. Ball bearings should also be used in other instances where practical.

The lay-out and planning of a mill have considerable effect on the amount of power required. Spinning frames are sometimes placed crosswise of the mill, and long lines of shafting are run lengthwise of the rooms from which the spinning frames are driven in pairs. The efficiency of this type of drive is decidedly low, because of the long belts required, which are practically quarter-turn belts running over idlers, and are naturally of varying tension, even though they must of necessity be run very tight. This type of drive has been multiplied, whereby four frames can be driven in the same manner, which is even a less efficient drive than the other one. A properly laid-out centrally driven mechanical drive, while fairly economical, loses a large percentage of its efficiency due to the excessive amount of friction of the shafting and hangers. In order to have a balanced application of power, and to avoid excessive torsional strains, the motor should be located whenever possible at the center of the load of the shaft. The diameter of the shaft should be just large enough to transmit the required power. If it is too large the excessive weight will require more power to drive it. It is generally considered that the most economical drive is the group drive. For some purposes individual drives are the best, but the cost of installation, repairs and maintenance will sometimes exceed group driving. A number of machines having a high starting load can be put into a group and driven by a motor whose total horsepower is less than the total horsepower of the motors if the machines are individual driven. For example, a card requires one and one-half horsepower to operate and three horsepower motors would be required. If put into a group of ten, a fifteen horsepower motor will drive all ten cards and operate them very efficiently. Of course, all ten are not started at once, but are thrown in one after the other so that the peak of the load of each machine is easily carried by the large motor. In many cases a larger motor is used than is actually needed, which means a waste of power, though it is better to underload a motor than to overload it because of the heat that is generated by the overloaded motor. This excessive heat is not only undesirable but it is detrimental to the motor.

The effect of excessive humidity on the power required to drive is considerably more than is generally supposed to be the case. Sufficient humidity to cause the work to run well is not only desirable but absolutely necessary. Excessive humidity is costly, both on account of the work not running well, and of the extra amount of power required to drive—the extra power being due to the "drag" of the fiber in its unnecessarily moistened condition and to the

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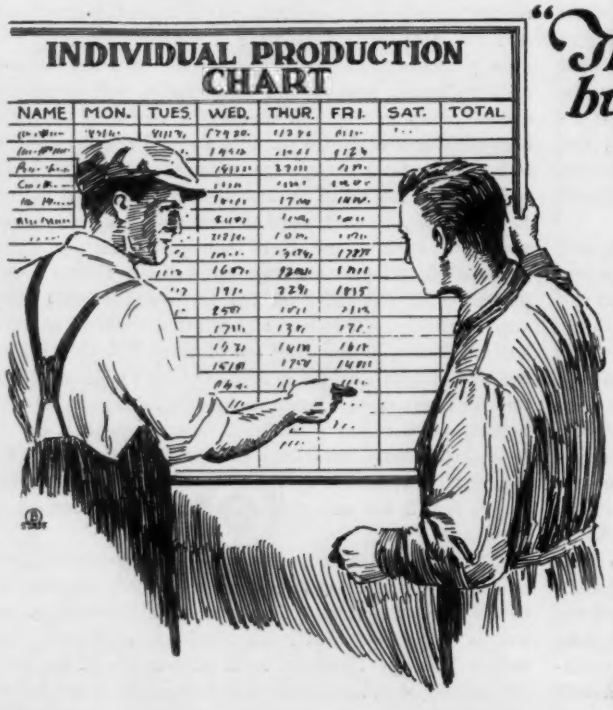

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increased band pull due to the effect of the excessive moisture on the spindle bands. Another influencing factor upon the power of a mill is the temperature. It is the effect of this that makes a mill start up hard in the morning, especially on Monday. The reason is improper lubrication, largely affected by the temperature and the relative humidity.

Other factors which cause more power to be used than necessary are: shafting in bearings too tight, dirty shafting and pulleys, too heavy travelers on spinning frames, poor bobbins, and rings not concentric with spindles. Increasing the production of a machine also increases the power required to drive that machine and various makes and models of machines require more or less power.

If the foregoing causes of high power costs are studied and all the various items that affect the amount of power consumed are carefully watched and the suggestions that are offered followed, the chances are that the power bill in most any mill will be reduced. N. B. M. (Va.)

Wishes More Discussion on Slashing.

Editor Cotton:

It has occurrel to me that there is not enough discussion in Cotton on slashing or dressing. We all know that slashing is to weaving what picking is to carding, and I think it should be more widely discussed. To break the "ice" I am going to ask your readers the following questions:

First, what per cent of softening do you put in the size kettle to every 100 pounds of starch; how much water do you put in; and do you boil your mixture and then add sufficient water to finish filling the size kettle, or do you start with all the water you intend to use?

How long do you boil your mixture? Do you have a standard by which you go in boiling strach and softening? At what temperature do you keep the size box of the slasher? How often do you clean such size boxes and what system have you? Do you use the positive drive on your slashers, and do you approve of this method over the old method? How often do you lease out the yarn? What steam pressure do you carry on the slashers? Do you use a circulating system; if so, do you have a storage tank to take care of the overflow, and at what temperature do you keep the size in this tank?

I, of course, have my own opinions on all these questions, but would like to have them discussed in Cotton before advancing my answers. The methods we use at our mill prove very successful on our class of work and we are getting a good percentage of yardage per loom, and our percentage of seconds in the cloth is comparatively low. Of course, after prolonged experiments I have found that 10 stoppages out of every 100 is all that I could attribute to the effects of the slashing or the compound we used, as the other stoppages were due to threads, gouts, knots, broken harness, etc.

Do you file off the sharp edges of the loom beam heads? This can be easily done while the slasher is running, by holding a file on the edge of the beam, the revolution of the beam furnishing the power. Doing this stops making a thread break while unwinding on the loom.

Have you a regular system of how many ends to count off in the lease comb, according to the number of warper beams you have up at the back of the slashers, making it come out on the front leased out one end of the lease rod, thereby making sure it is leased out so there will be no cases of two threads slashed together, and be sticking on the looms, causing loom stoppage?

Did you ever realize that the tying-in man on a tying-in machine can usually tell you more about the way the slashing was done than you could see for yourself by standing around the slashers? He's there all the time and you are there only occasionally. The tying-in machine will tell the tale nine times out of ten. Listen to the tying-in man when he is complaining that the selectors are beginning to stumble over the yarn, skipping and making slip knots, etc.

It would be interesting to have your readers discuss the foregoing questions, and I'll be glad to chime in the discussion with my own opinions thereon. Contributor No. 14.

Good Picking the Foundation of Good Yarn.

Editor Cotton:

In order to show the young men in the mill, who are coming up to take higher places, how important their jobs should be to them, I shall endeavor to bring out some thoughts here that should be considered before the cotton is started through the machines.

First, what kind of cotton have we, what kind of goods are we to make, and what is the general condition of the machinery? If we have a cotton buyer he should know by keeping in constant touch with the superintendent what kind or grades of cotton will be best adapted for best results. Say our cotton is okeh for the intended goods, then the overseer of carding should know all about the cotton fiber, and the art of preparation of cotton for the carding process.

What comes first as a good foundation for both warp and filling? A good even mixing of the different grades of cotton to get an average throughout. We will take 8, 10, 12, 16 or perhaps 24 bales in a pattern mill to bring out an even color or blend, whereas in a gray goods mill we can have 20, 30, 40 and even 75 bales mixed at a time, which helps considerably, as cotton well aged will work more evenly and is not so wiry. I think this one thing needs more consideration in our mills today.

Having obtained a good mix, we will pass on to the machinery. All mills are not equipped alike, so we will assume we have a pattern goods mill. Cotton dyed raw is much harder to work than white stock. We feed our cotton from the mixing bin direct to the opener hopper. The opener hopper should be kept two-thirds full at all times. This in itself gives an even feed to the breaker picker, that is, where the cotton is conveyed to the breaker by trunks. These machines should be kept clean and well oiled, and the spiked beater should not run over 575 r. p. m., or even lower. On my present job we have this system.

If changing from one color to another, care must be taken to avoid waste and also things which will cause seconds. Seconds sell for less than firsts. Stop, look, and listen, because we must have a good foundation in assuring the best results for the mill. It is not the man who can run the most through an opener picker that counts, but how well he handles what he does run thruogh. Let me say right here that every picker room in this country should have plenty of machines. Some overseers cannot deal with the cotton as it should be dealt with.

Now the cotton comes to the breaker. There is an art

in handling this machine. The speeds should be moderate, screens in good condition, air passages clear of waste, good leather on the ends of the screen, grid bars set to staple and class of cotton being run, no lost motion in any of the gearing, no back-lash in the bed rollers, lap racks should work freely, no slack belts, no more air or draft than just necessary to lay the cotton evenly on the screens, two-wing steel beater, 1150 r. p. m., and feed slow and light to obtain a clean, even lap.

All oil holes on pickers ought to be cleaned every time they are oiled because there is so much foreign matter at this process that tends to keep them stopped up. Cleaning out the oil holes and oiling with a drop or two of oil is far cheaper than a new bearing or shaft and the loss of the machine while it is being repaired. An ounce of prevention is cheaper than a pound of cure.

We use Kirschner beaters in our intermediate pickers and we have eveners on these machines also. The intermediates and finishers are treated with great caution. I believe that with the proper system in the picker room we will not have so many thick and thin places. If there is no back-lash in the gearing, screens and rollers, and no slip of the evener cone belt, more than likely, good even running work will be the result.

Then there is one other thing, after we have dealt carefully with the fibers in the opener, breaker, intermediate and finishing picker; there is still one most important thing, and that is the weighing of the laps. I have a man assigned to this place, and he makes his salary several times over in a week. Our variation is six ounces each way from standard. I have four reports or weighings each day from the cards, so I can show these to the lap weigher. Thus, he does not allow anything but quality to go by him.

Having thus established the foundation for good work in the picker room, next take the lap to the card. There are some very fine points in connection with the card, and these are the settings. I do not offer any fixed rule for this, because differences in cotton, location, men and machines, alter the rule. But I do want to say that there is a science to setting cards.

Cards should be lined with the shaft, and leveled perfectly. Experiments pay sometimes. The doffer comb should be set away from the doffer as far as possible and still comb off the web and leave the motes, neps, etc., to be taken off by the stripper roller. The web should never be allowed to sag too much, and it should not run tight at any time.

Great vigilance should be exercised in the oiling of a card. Oil should never run out on the clothing as it softens its foundation and when this occurs the wire will not stand up under the grinder roller. Moreover, it will bend backwards and become faced. Card clothing is worth taking care of, and if any overseer be guilty of slackness, let him refrain from so doing.

Take the card sliver now to the drawing and run six ends into one. This is the first occasion of actual drafting. This machine is usually looked on as simple, and generally everybody says, "Take him (or her) and teach them on drawing." Nay, nay. That won't do. We need the very best help possible on drawing. You can ruin all that the picker and card has done on the drawing frame. First of all, this machine should be perfectly level and properly lined, and the very fine adjustments made, setting the rollers to the staple being worked, speeds regulated, frames kept oiled but not soaked in oil, etc.

The tension will play havoc with the drawing delivered if it is run too tight, and if run too slack the sliver will loop in the trumpets and make knots in the roving on the slubber. The draft on drawing frames should never exceed six inches, and not that much on low-grade cotton.

I once knew a man who told me, "Son, I am 84 years old, and have served 62 years in the mill. I tried to do my best, but I learned of new things through that period and even a week or so before I retired." If we stay on the alert we shall always find some things that can be improved. The best there is is none too good in cotton manufacturing. A. B. (Ga.)

Reads Every Article in Every Issue.

EDITOR COTTON:

In describing some new devices in the June issue of COTTON, "Wash (R. I.)" has certainly misconstrued my meaning when I asked him, in the April issue, to get away from the antique stuff and let us have some of his honest-to-goodness progressive causes and results. As for Robert Huskey's article, on page 183 of the January issue, it does not make this efficiency man in textile plants any less antique than had John Doe written the two articles, according to my way of thinking.

In commenting on "Wash's" article, I did not refer to any statement ever made by "Wash," except in this particular article, and certainly that would not infer that "Wash" is an old-timer. I recall a statement by "Wash" that he never tried to get the best of a contributor, but in discussing and criticizing statements did so to bring out the best in any subject. I can express my own sentiments by quoting this same statement, although I do not always agree with everything all the contributors, including "Wash," say in all the articles, for when results are at stake, I'm from Missouri.

I can get weather reports from an almanac, but I read every article in every issue of COTTON, aware of the fact that these articles in no way reflect the opinions of the editors; that COTTON covers Dixie like the dew; and that its pages are perused by many other textile men in these United States who have the same keen interest that I have in COTTON and the industry it represents. I think the men who discuss the subjects in the "How Other Men Manage" department are of the very best individual pebbles, but they are not the whole beach. So, acting on "Wash's" advice, I shall keep on reading COTTON and keep on commenting on what it is doing for us. Competition (N. C.)

An outline of the service which they are equipped to render is given in a recently published booklet by the Cotton Research Company, 1020 Washington Street, Boston, Mass. The questions of plant surveys, laboratory service, and experimental testing are discussed and a description given of the facilities with which this organization is equipped to furnish services of this character. Fessenden S. Blanchard is president of the company, with Ernest W. Walen, M. T. E., M. E., as manager and Sidney S. Paine, Ph. B., assistant manager.

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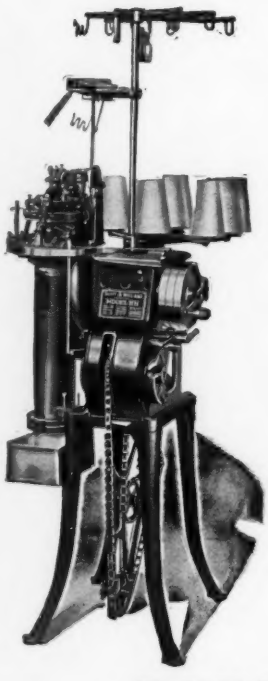

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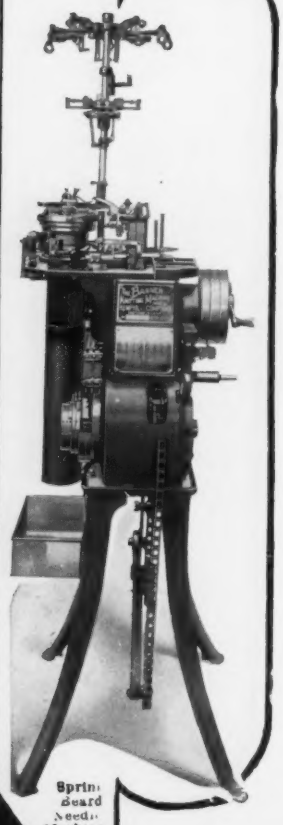

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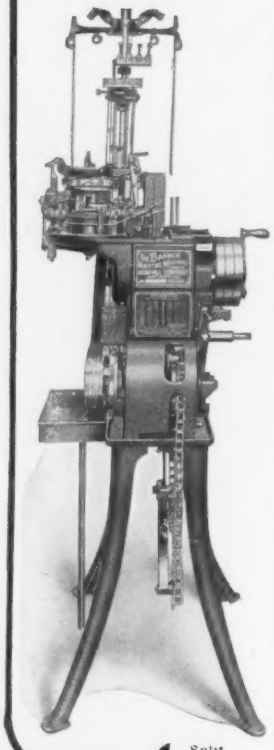

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New Developments in Hosiery Manufacture

BY WILLIAM DAVIS, M. A.

In many types of hose producing machines the system adopted for certain standard articles is to have one machine of rib lay-out for the making of the rib tops and a second machine equipped with the necessary tackle for making the leg, foot, heel and toe. This necessitates a double operation, one machine and operator for the rib top and one machine and operator for the leg and foot, while a further stage is necessary termed running-on which consists in running the rib tops, stitch by stitch, onto a transfer ring from which it is readily slipped to the machine needles. This latter operation is generally entrusted to a young worker who, in learning, commits many errors of judgment so that when the rib top joins the hose, faulty stitches often occur as the join is not properly effected.

Further, by this system of making hosiery, the ribbed part is made under different conditions of tension than the leg or foot and where the join occurs this lack of uniformity is often quite plainly visible, notably in a tightening of the tension of the stitches just where the join is effected, or a certain raggedness or dimness where the ribbed stitches join the leg. From the nature of things it is natural that many efforts should have been made by the machine builder to produce those two parts of a hose on one machine without the trouble and loss in time of doing them in separate sections, and the subject of this article is to show how one British firm has solved these difficulties and has evolved a machine which, by its successful performance, is taking an important place in the hosiery manufacturer's equipment.

To bring this machine to a successful culmination in regard to mechanical efficiency has been the goal of a mechanical research extending over many years of strenuous endeavor, but the machine has now been tested in a number of first-class firms over a short period of years and the reports are uniformly satisfactory as to achievement. Most British-built hose machines follow the principle of the revolving camboxes and the stationary cylinder and needles, but this machine adopts the style largely prevailing in American-built hose machines, for we find that the cylinder, needles, fabric and fabric holder all revolve, with the result that output has been speeded up to a satisfactory point.

The chief feature of the stitch formation is the extra cylinder placed directly above the ordinary needle cylinder of the machine so that needles can be moved from grooves in the lower cylinder to corresponding grooves in the higher cylinder in the same plane. The earlier machines were constructed on the principle of having the ribber needles arranged at right angles to the cylinder needles so that in transferring the stitches from one set to another, they had always to be carried through a right angle which prevented any kind of mechanical development, as the right angle twist could only be executed by hand. Along with the upper cylinder the machine has the two-headed needle so that it can work from either end when required; for plain work the needle operates in the lower cylinder but for rib work the needle is moved from the lower to the higher cylinder from whence it makes rib work. The principle is that of direction of discharge of loop, when the needle operates from the lower cylinder, it throws its stitch upward to knit; when it works from the upper cylinder, the needle throws its stitch downward to form the loop.

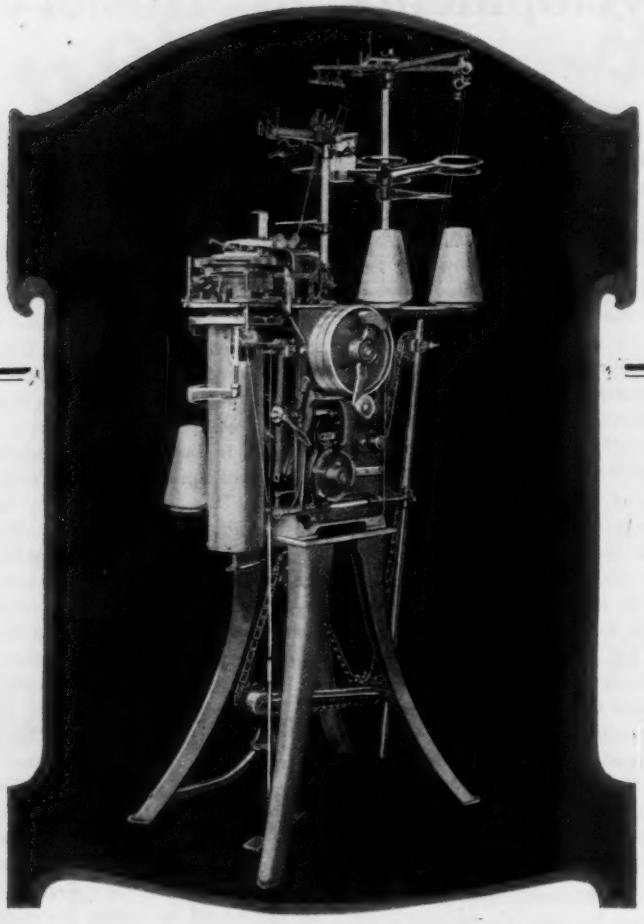
To produce the knitting action there is a set of cams in the lower cylinder and another set in the higher cylinder, those in the lower cylinder need to be provided with a double set of cams so that they may knit in both directions as is required for the making of the heel and toe. The upper cylinder, on the other hand, only requires one set of cams, as the rib needles are never needed to work in both directions, but only in the ordinary direction for straight knitting. Further the cams in the lower cylinder make provision for producing the heel and toe by reducing the number of needles in action for the first half of the heel and increasing them in the second half, this being done by a depressor cam. Like most other hose machines, this type has the needles in the back half of the cylinder provided with butts which are higher than those in the front half so that the high butts can be operated by themselves; that is, they can be raised up out of reach of the knitting cams prior to the commencement of the heel or toe. After this is finished and we are ready to begin the leg or foot once more, these raised needles are again depressed into knitting action by means of a cam which operates on the butts by reason of their being higher than the ordinary butts. In Fig. 1 is given a full sketch of the stitch-forming parts of this machine as they work in the lower cambox and the principles which govern the operation of this machine will best be understood by taking the stitch-formation in sections. The various parts of the stitch-forming cams are shown in the sketch and the following give their names: GC represents the guard cams which, as the name indicates, act as guards for the needles by keeping them in their proper path in the machine. The cam marked CC is termed the center cam, while the stitch cams are indicated by S and S_1, NRC and NRC_1 represent the needle return or the needle upthrow cams; NLC indicates the needle lifting cam; P and P_1 represent the pickers, while D is the depressor, DC the dividing cam; BRC is the bottom receiving cam; TC is the transfer cam.

Making of Plain Stitch.

The needles N approach the cams from the left in the diagram, and the first move is to have them raised slightly on the shoulder of the stitch cam S to take their thread from the thread guide. Directly after this is done, the needle butts pass against the left side of the center cam which moves them down into the path of the second stitch cam S_1, which takes them to their lowest position to knock over the loops. The needles next pass against the sides of the needle return cam, NCR_1, which, as the name indicates, returns the needles once more to their normal position in the machine.

Reverse Knitting.

In reverse knitting such as has to be done on heel and toe at alternate courses during the reciprocating motion, the needles approach the cams from the right and their



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first move is on the shoulder of the stitch cam S_1, which causes the needles to reach to the thread guide to receive their portion of thread. They then pass along the right side of the center cam which brings them down into line with the stitch cam S, which takes the needles down still further and causes them to knock over their stitches. This done, they come against the edge of the needle return cam NRC, which restores them to their normal position on the knitting ledge.

The production of the heel and toe proceeds along the standard lines for such machines, the first stage being to narrow the needles one by one on each side until about one quarter of the needles are working, after which this is reversed and the needles are brought into action one by one on each side again until they are all working.

These remarks apply to the needles in one-half of the cylinder only, and to secure this separate treatment, those needles in the back half are provided with butts which are a little higher and project further from the cam box than the others. These high butt needles can then be acted upon by a special cam so placed that it catches those butts but misses the ordinary low butted needles. This cam is shown in the sketch and is marked NLC, the needle lifter cam. This cam, during ordinary knitting, is under the level of knitting action, but when the heel has to be started, it is brought up into the dotted position where it projects out in such a way as to catch the high butt needles and throw them into the idle groove IG, where no knitting takes place. After this is accomplished, the machine changes to the reciprocating motion and the shaft slows down.

Another thing that happens is that the pickers P and P_1 are brought into action, in this machine P, which, during the plain knitting, rests up beside the center cam out of the way in the doffed position, comes down into the usual position on the back of the stitch cam S, the opposite picker, P_1, coming into position on the back of stitch cam S_1. When the needles approach from the left, the first of the series catches in picker P and is thrown upward in the line of the arrow so that the needle is lifted onto the shoulder of the center cam over which it passes into the idle or non-knitting groove IG. When the direction of knitting is reversed and the needles approach from the right, the first needle of the series catches in the mouth of picker P_1, which is swung along the line of the arrow, placing the needle on the shoulder of the center cam so that it passes into the idle groove. This takes place on each side alternately until only some 20 or so needles remain in work.

Heel Widening.

When the narrowings for the heel are complete, the process is reversed and the stitches are replaced in position one by one on each side until they are all in the knitting position once more. This is effected by what is known as the depressor picker shown on the right of Fig. 1 and marked D. It will be noticed to be T-shaped and is of such dimensions that under each wing of the T two needles can be held on both right and left. The next point is that the depressor picker is located in line with the idle groove so that the needles in this groove rush into it and are carried downward into knitting position. This cam being of the shape mentioned, it requires to be able to operate towards the right or towards the left downward, according to the direction from which it is caught by the needles, and the cam having been drawn downward, springs back again when the needles are replaced in the knitting level. But the depressor takes down two needles at each dip, and of these the first is caught immediately by the one or other of the ordinary pickers and promptly thrown back once more into the idle so that this gives a net gain of one needle placed in work at each course, this continuing until the heel is fully widened and all needles in the front half are again in work.

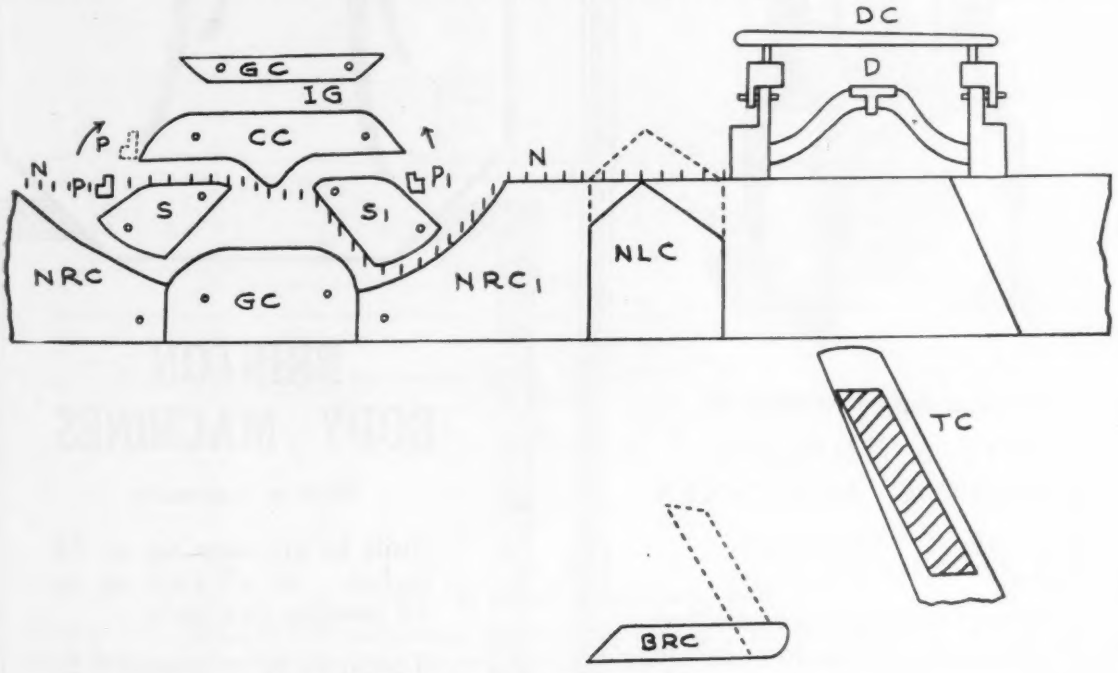
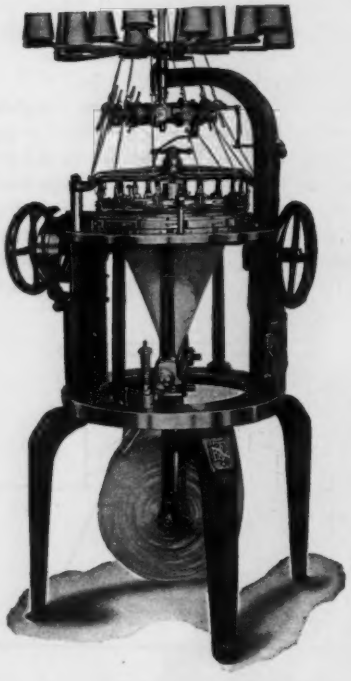


Fig. 1. The Stitch Forming Parts in the Lower Cam Box.

The Upper Cam Box.

This machine cannot be fully described in its action without reference to the construction of the upper cam



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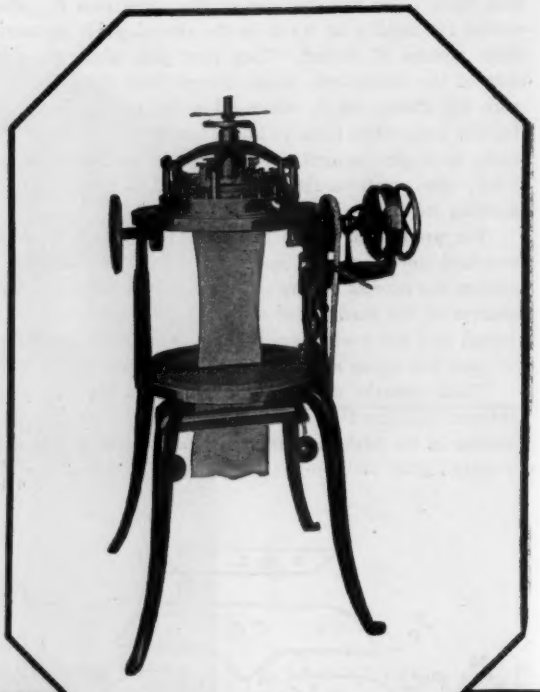

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box, which is given in the sketch, Fig. 2. It must be clearly understood that only those needles which are transferred to the upper cylinder require to knit and that the upper cylinder takes no part in the reciprocating motion for heel or toe, nor do those cams have anything to do with the widenings or narrowings created in the heel. During the making of heel and toe the front half of the needles are all in the lower cylinder working plain stitch. Thus it is that a double set of cams are unnecessary in the upper cylinder and arrangement only requires to be made for knitting in one direction.

Again our ideas must be reversed in connection with the knitting action, for in this action the needles discharge their stitches by being drawn upward, while they are pushed downward to receive their thread from the thread guide. Keeping this proviso in mind, it should be possible to trace the action of the cams of the upper cylinder, given in Fig. 2, to the lettering of which the following gives the key: GC are guard cams whose function is not positive and aggressive but merely that of taking precautions that the needles are kept in their proper knitting grooves during work. WG is the welt groove, another name in this case for the idle groove because when they are running in this position they do not knit but remain inoperative. This is rather an important part of the hose rib top because it is the four or five courses of welt which give the neat and tidy finish to the rib top. The principle is the same as is adopted on other rib machines for welt making, the ribber needles in the upper cylinder are thrown into the welt or idle groove for several courses to allow the lower cylinder needles only to work, which has the effect of causing the plain loops to turn round at the edge and give a smooth finish to the article at this point.

KG represents the ordinary knitting groove or level and when the needle butts, N, run in this they are in knitting position and will form their loops. Of the loop-forming cams, we recognize that one marked LC, which is termed the lowering cam, and it will be noted that its action is to lower the needles in the upper cylinder so that they reach down for the thread which the carrier holds out to them. Having received the thread, the next action is to raise it, and this is done by the needle butts coming against the side of the raising cam RC. Further along the needles reach the two stitch cams marked S_1 and S_2, the first stitch cam, it will be noted, has a kind of hump and this gives the first stage in knocking over or discharging the loops from the needle ends. After this is done it will be perceived that there is a gap which is useful in giving the thread time to recover from the shock of the first knock over, for this takes the strain momentarily off the yarn. The needle next arrives at the second stitch cam, S_2, which, it will be observed, is slightly higher and sharper than stitch cam S_1 and has the effect of giving the *"coup de grace"* to the formation of the stitch, for it is thereby drawn up further and the stitch is drawn through with a very clean and definite movement.

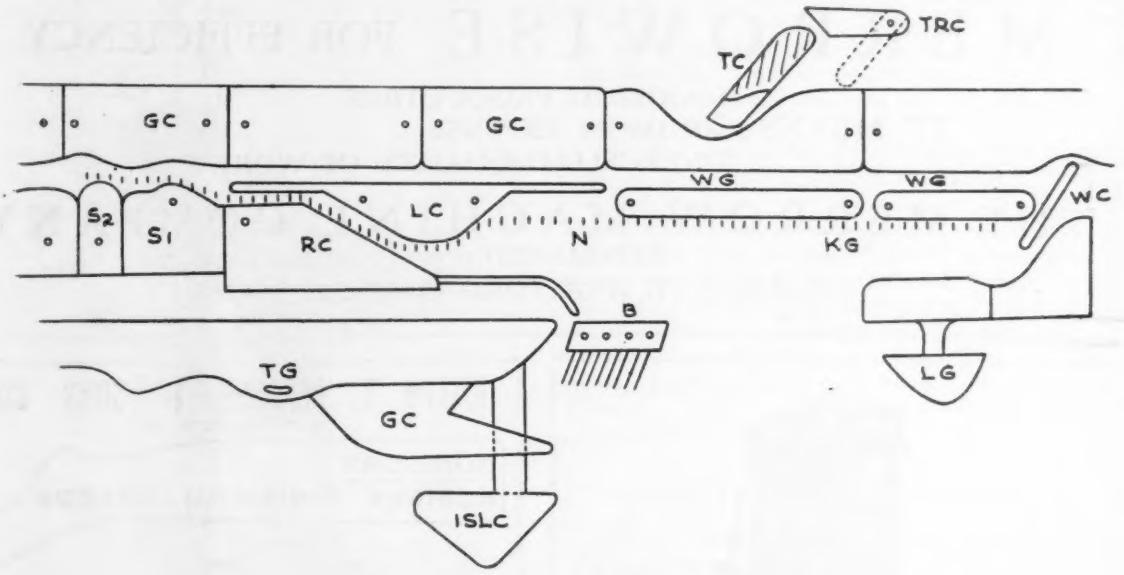

Fig. 2. The Details of the Upper Cam Box.

These adjustable double knocking-over cams are quite a feature in this machine and enable yarns to work which might not withstand the strain of the pull through at one operation. The welt cam WC is shown in position where it is placed for ordinary knitting, but when the welt fails to be made, this cam is withdrawn and the needles pass into the welt groove where no knitting action is possible.

In this sketch we have been able to show the location of the thread guide for the yarn marked TG; there is also a brush marked B which performs the usual function of opening the latches during knitting, while the machine is also provided with latch guard, LG.

Transfer Action.

Undoubtedly the most clever action of this machine is that of the transfer of the double-headed needles from the lower to the upper cylinder and back again from the upper to the lower cylinder. This action took a long time to perfect and the system of bringing it about is clever and ingenious. All transferring action must take place in two stages and to understand those, we must consider the na-

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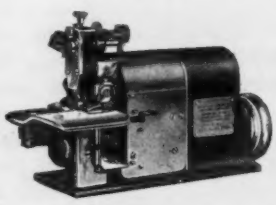

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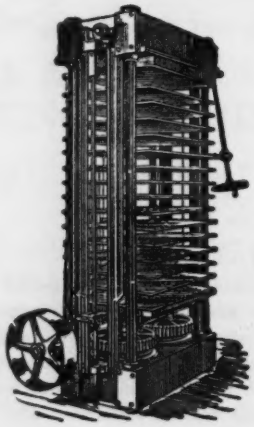

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ture of the motion given to the needle. Each double-headed needle is provided with two sliders or jacks, one located in the upper cylinder, the other placed in the lower cylinder, and only one of those jacks can be in contact with the needle at one time. If the upper jack is in contact with the needle, it engages the upper hook and works rib; if the lower slider is in connection, it causes the needle to work from the lower cylinder and creates plain work.

The double-headed needle itself has no knitting butts but the jacks it is connected with have two, one is the ordinary butt from which knitting takes place, the other, located near the extreme end of the slider, is termed the transfer butt and is used for transferring the needle from one cylinder to the other. In addition to this transfer butt

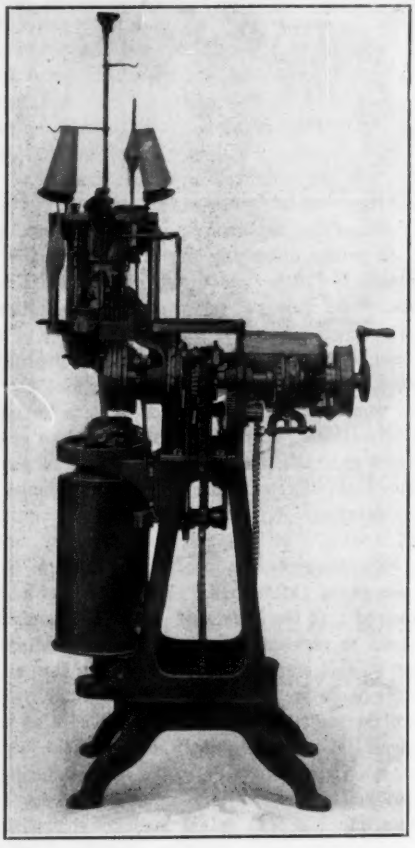


Fig. 3. The Entire Machine.

there is a receiving cam in the top cylinder and a similar cam in the bottom cylinder. For the transfer movement, therefore, we have a transfer cam and a receiving cam in the top cylinder and a similar pair of cams in the lower cylinder.

The transfer cam acts on the transfer butt of the slider and pushes the slider and its needle partly out of the cylinder. In doing this another cam comes into the picture, called the dividing cam, shown in Fig. 1, and marked DC. This is so placed that when the transfer cam pushes the slider down to a certain point, the end comes against the dividing cam and is lifted out of connection with the needle hook. At the appropriate moment the receiving cam in the opposite cylinder pushes the opposing slider up so that it slips into connection with the hook of the needle and the slider and needle are drawn down to the lower cylinder.

A similar set of motions is required when a needle is being transferred from the lower to the upper cylinder, namely, the transfer cam acts on the transfer butt to push the needle and slider upward, and when these reach a certain height the end of the slider comes against the dividing cam and is forced to release its hold on the needle. At the same moment the top receiving cam pushes down the opposite slider so that it establishes connection with the needle and the needle and slider are drawn up into the higher cylinder.

In the sketch of the upper cam box, Fig. 2, will be noticed a cam marked the ISLC, which, being interpreted, means the instep slider lowering cam. It will be remembered that to make the heel or toe the needles with the high butts located in the back half of the cylinder were raised; when the heel or toe is finished, these needles require to be lowered once more into knitting position and this is done by the cam just referred to. When the heel or toe is complete this cam is brought into action and is placed so that it catches the high butted needles in the idle groove and lowers them once more into ordinary knitting position.

Figure 3 gives a view of this machine. There is a difference in the system of taking-off the hose from the ordinary American hose machines, where the hose swings round with the needles, and each hose, as it is completed, drops from the needles and another article commences. In this machine the whole lower framework revolves with the needles and the fabric, the hose remaining attached together in a long string, which is afterwards cut apart, as is the custom in some types of hose frames. There is the usual arrangement for slowing down the shaft when the heel is commenced as well as the changing of the motion from circular to reciprocating.

Rockford Mills to Sell Direct.

There is no little speculation among hosiery manufacturers in the question why three important Illinois mills have discontinued distributing to jobbers through a selling agency and have decided to sell direct. Announcement to this effect would have attracted less attention, probably, but for the fact that in the direct selling the lines of the several mills will be handled by the identical persons who were conducting the selling agency—the Rockford Textile Sales Corporation, in Metropolitan Tower, New York. The mills whose products were distributed by this corporation are the B. Z. B. Knitting Co., Nelson Knitting Co. and the Rockford Mitten and Hosiery Co. In a joint announcement to their trade the mills say:

"The knitting industries of Rockford which comprised the Rockford Textile Sales Corporation have decided to abandon the same and in future to sell their product from the respective mills, believing and feeling that we can get in closer touch from the mills."

The Chicago and San Francisco offices of the sales corporation have been discontinued, the New York office being maintained at the former location. The announcement of the three Rockford mills seems to have revived interest in the question whether there is advantage in selling direct, as against through a mill agent, since, in either case, an office must be had in the city of the primary market.

The Yarn Market

Developments during latter August and September made some very material changes in the fundamental condition of the Philadelphia cotton yarn market. For several months, including mid-summer, the market rocked along with a noticeable absence of business and with yarn quotations finding a new bottom on the price scale almost each month. This condition continued more or less generally until the first of August, when spinners began to stiffen and prices started the other way.

The last days of August and the month of September witnessed the spinners in an even firmer attitude with regard to prices than they had been several weeks before, and the result was higher quotations from the mills on most of the counts. The increase in asking prices applied with greatest effect to carded yarns for weaving, with knitting yarns from carded mills coming second, and all combed yarns bringing up the rear with practically no upward change from the lowest level of the year since July, until the first of September came along and with it brought the government's low condition report and a production acreage estimate that was several hundred thousand bales less healthy than the previous one. This inspired combed yarns into action, and resulted in a boosting of price which it was expected would lay the foundation for a better basis upon which these yarns should work during the rest of the year.

It would be difficult to accurately chart the increases in rates over the period being reported here, because of several factors. The elevations in the price scale were not regular; they came suddenly and they came gradually, depending upon the motive power or force behind them; spinners' asking rates, as a rule, maintaining a level that was a few cents higher than the ideas of the dealers in Philadelphia; and yarns in stock in dealers' hands were in instances turned over to new owners at prices out of line with either basis. However, a month saw most of the counts of each grade take on several cents—it was estimated that August witnessed a general advance of from three to four cents, taking the list as a whole, with certain much-in-demand grades going considerably above this average to compensate for those numbers falling below it in their value increases.

The following specific comparisons in asking prices might be recorded: 30s/2 carded warps, generally regarded as a typical count, was quoted at 48 cents a pound on August 17, and on September 12, less than a month later, was being offered at a spinners' price of 55 cents, a gain of seven cents. In the list published here last month, showing the quotations of August 17, 30s carded yarns for hosiery was listed at 45½ cents, and three weeks later spinners' rates for this count had risen to 52½ cents.

It is, of course, understood that no published quotation list could represent accurately every sale of every case or warp of yarn, but the figures used herein are conceded to approximate the general condition of the market. It was noted that since August 1st the market has been on a continuous upward price trend, with no backlashing in the gears that moved the quotation trend to higher levels, and while further advances might come during the days that are to come before 1923 is no more, it was felt in some quarters that the price indicated by the appended list contain the major advances of those that will occur during the latter half of the year.

Better cotton values—whether or not they were incited by this cause or that—naturally had quite a bit to do with the price increases in the intimately allied yarn market. The government's report on September 1st did its part in boosting yarn rates. These two factors, coupled with a continued determination on the part of spinners to raise the market value of their mills' product, did most of the boosting which placed the market on the higher level on which it passed through September. At all times it seemed the spinners took the lead in price advances, and during the month it was pointed out that a frequent disparity existed between their quotations and the prices of their dealers; in some instances, it was related, yarn dealers in Philadelphia of necessity exercised some diplomatic salesmanship while they submitted bids to their spinners for approval or rejection; and in view of market conditions, this feat was quite difficult upon occasion.

With regard to business—which, after all, is what counts—the optimist in the market, generally speaking again, seemed to prefer discussing the prospects of the more or less immediate future than to tell of business actually being done. As a matter of fact, underlying conditions pointed to a promising prospect for the remainder of the year, and a number of important factors, basing prediction upon precedent, were of the opinion that the last four months of 1923 would contain the big bulk of yarn buying for the year. Even during September a better feeling among yarn consumers generally was apparent and there was the undeniable fact of curtailment being abandoned and of the re-operating of machinery that had been idle for several months. It was felt that recovery would first come with the weaving trades, the others to fall in line somewhat afterward. Investigation and deduction showed that the shelves of consumers should be rather bare, both as regards their own finished products and the product of this market, and it was felt that a more cheerful atmosphere in business generally would reflect itself through the regular channels into a resumption of interest for yarns. It must be stated, however, that, according to report, considerable inquiry was developed during September, but that the higher rates quoted made the translation of these inquiries into actual business somewhat difficult. The permanent result cannot be ascertained at this writing, but it was felt that business would soon operate on the higher plane.

Philadelphia quotations on September 14th follow:

Single Skeins.

4s to 8s	43	10s	44
12s	45	14s	45½
16s	46½	20s	48
24s	50	26s	51
30s	52		

Single Warps.

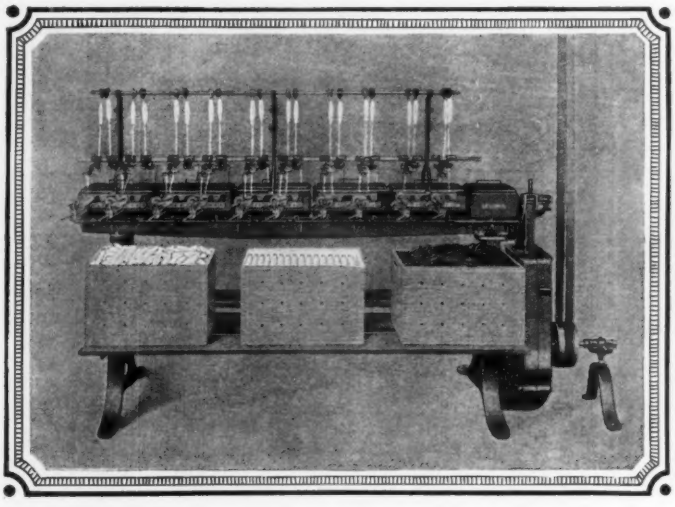
8s	44½	10s	45¼
12s	46½	14s	47
16s	47¼	20s	49
26s	51½	30s	53
40s	61 @62		

Carpet and Upholstery Yarn in Skeins.

8s and 9s 8-4 slacks	43½
8 3-4 tinged tubes	39¼
8 3-4 hard white warp-twist	41½
8 3-4 hard twist waste	39½

Two-Ply Skeins.

8s	43	10s	44½
12s	45½	14s	46
16s	47½	20s	49
24s	51	26s	52
30s	53 @54	40s	61 @62



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8s	44½ @45	10s	45½ @46
12s	46½ @47	14s	48
16s	48½	20s	49½ @50
24s	52	26s	53
30s	55 @55½	40s	62 @63

Frame Spun Carded Yarn on Cones.

8s	42½	10s	43½
12s	44	14s	44½
16s	45½	18s	46½
20s	47½	22s	47½ @48
24s	49	26s	50
30s	52 @52½	40s	60
40s double carded			53 @54
30s tying-in			50 @51

Two-Ply Combed Peeler Skeins and Warps.

8s to 16s	56 @57	20s	58
24s	60	30s	65
40s	75	50s	80
60s	87½ @90	70s	95 @$1.00
80s	$1.00@$1.15		

Mule Spun Carded Yarns on Cones.

10s	46	12s	47
14s	47½	16s	48
18s	48½	20s	50
24s	52	26s	54
30s	57	40s	67

Mule Spun Combed Peeler Yarn on Cones.

10s	53	12s	54
14s	55	16s	56
18s	57	20s	58
22s	59	26s	64
28s	65	30s	66
36s	68	38s	73
40s	75		

The Knit Goods Market

Almost immediatcly with an outburst of activity among speculators in raw silk following disturbing advices from Japan, manufacturers of silk hosiery were scouring the market for odd lots, large and small, of both raw and thrown silk. This, of course, had been anticipated by importers and jobbers dealing in the fiber, and fortunately for manufacturers, all quotations were withdrawn by the time mills were offering a dollar a pound above the last market prior to the receipt of the news that sent prices soaring.

Only a week before, importers were offering silk under the market in competition for business. A Philadelphia manufacturer bought somewhat heavily of Best No. 1 Extra at $6.85, which was forty cents below current quotations. Within five days he could have sold his contract for fifty bales at an advance of $250 a bale. Another had refused to pay $7.40 a pound for thrown silk less than two weeks before it was fetching 50 per cent more.

Few hosiery mills owned enough silk to carry them along for more than a month or two. They were getting little business and looked for a decline, and, therefore, deferred purchasing. A comparatively few mills had bought for three to four months, but under the contingency clause in contracts it became a question as to when deliveries would be made, if at all. Mills, it was generally conceded, would have been justified in marking prices up commensurately with the prospective higher market value of raw silk, but were slow to take advantage of an opportunity thrust upon them by the disaster in the Orient. It was common opinion that prices of all silk manufacturers would go higher—that advances, for a time, would be progressive.

Jobbers affected to be not disturbed by the prospect of higher prices. Except among some of the larger houses there was manifest a determination to buy no hosiery on the rise until retailers came along with orders that could be relied upon to stick. It seemed to be the unorganized purpose to buck silk prices by remaining out of the market until the last call, leaving it to manufacturers to take the hazard for them and thus possibly prevent or, at the best, delay any upward revision of mill prices.

Some of the same jobbers who were giving no attention to silk goods in the face of absolute knowledge that a stiffer market was as certain as nightfall after a sunlit day, were no less indifferent toward cotton hosiery and underwear during the week following the cotton crop report telling of a yield of less than 11,000,000 bales. "I do not credit the government figures," one important buyer said. Another thought the higher price of cotton would have the effect of so curtailing consumption that the price would decline to at least the level of early August. Southern jobbers, while relying on substantial returns for growers for a brisk winter business, a commission house executive said, were the chief and more persistent bears in the finished cotton goods market. They were the last to place initial orders for cotton hosiery and underwear for spring, it was stated, and appeared to be not much concerned by the higher prices for silk. It was up to manufacturers to carry stock for distributors or leave the fall market bare of goods.

A number of mills were operating short time; some closed down temporarily. It is the impression in the trade that there are no accumulations of silk and cotton goods, and that soon it will dawn on jobbers, if they have not already awakened to such a realization, that again they overstayed the market.

What happened to silk probably precludes the possibility of mills accepting any further business in ladies' hosiery of silk and wool in combination. In fact, manufacturers had about abandoned hope of additional orders except from retailers direct, late in the season.

Mills not covered for worsted yarn requirements were doing no buying in the softening wool market, for which there came discouragement in the announcement of only part-time operation by one of the mills of the American Woolen Company, because of lack of orders for light weight piece goods, in conjunction with disappointment over sales at the September London wool auction.

The strange situation was presented of the trade being timid of wool goods because wool prices had declined, and apathetic toward silk and cotton for the reason there had been unlooked for advances. From the standpoint of volume of business, September did not get away with a good start. But the anticipated buying spurt was only delayed while dazed buyers were recovering from the shock of having too long neglected an opportunity.

True to tradition, however, jobbers fought shy of low end cotton hosiery the moment prices began to harden, notwithstanding the prospect of a very material stiffening. There had been a fair volume of business in this class of goods for some weeks, on rumors of depleted stocks in mills, among which there was considerable curtailment. John M. Berry, Rome (Ga.) Hosiery Mills, who came North soon after cotton had settled down to firmness on a higher level, advised the trade to buy cotton hosiery, for the same reason, he said, he was buying cotton—in expectation of a further rise. He pointed out that hosiery then was priced on the basis of yarns at 35-36 cents, whereas on the day he was telling his friends to "get in" quotations ranged from 41 to 42. But the average buyer refused to be moved, and while yarns were climbing, a lower price

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CHATTANOOGA, TENN.

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Uniformity guaranteed by test before shipment.

Warren Soap Warren Service

Warren Soap Mfg. Co.
Established 1870
77 Summer St. Boston, Mass.
Incorporated 1890

came out on ladies' mercerized hosiery from two mills. Both had been selling a featured number at $3.60 and marked the price down by ten cents. Certainly this would not have been witnessed but for the antagonistic attitude of buyers.

Enough buyers were in the New York markets about and following the middle of September to give sellers some encouragement. A few who expressed confidence in the market said the merchandise men back home were not permiting them to operate; that they were keeping close to the commitment sheets in preparation for low inventories at the end of the year. But they were not giving such attention to spring goods as the situation seemed to justify, although purchases for next year might not appear on the end-of-the-year inventory sheets. To say that primary market sellers were disappointed with the light spring buying is to put it mildly. Even some of the innovations of a year or two ago, which since have come to be good sellers were neglected to the extent that more than one large mill selling to jobbers gave strong intimation that there might be an increase in the number selling to retailers direct.

It is stated by manufacturers and selling agents that there has been more activity in half hose than in women's lines, and some mills are known to be quite busy with their production of mercerized, fiber plated and all fiber socks. But the orders usually are for small quantities and early shipment specified. The trade was looking for an all-mercerized sock to sell at a quarter a pair, an achievement that at this writing is out of the question. The nearest approach to it is a 200-needle sock at $1.90 to jobbers. A 200-needle mercerized with combed top was offered at $1.75, and certainly was good enough to be a quarter retailer. But jobbers insisted on something better.

A buyer was impressed with a line of hosiery at $1.80 a dozen, which he confessed was so far superior to a number from another mill that it was easily worth the difference. But he said the bulk of his trade would not pay more than $2.15 and that therefore he would have to buy at $1.75 or lower. He passed up the superior stocking on a difference of five cents—less than a half cent a pair. The manufacturer whose stocking he rejected refuses to skimp his product as a surrender to buyers. Jobbers, he says, are responsible for the fact there is so much inferior hosiery on the market; that they establish a price, and mills, in need of business, meet it by cheapening the fabric. Then the mill gets the blame.

A Central West line of ladies' silk and fiber boot hosiery, drop stitch to the toe, is receiving a fair degree of attention for spring. It is a comparatively new number, running along with an all-fiber boot with Paris clocking, and an all-fiber with what is termed satin stripe, which is impressive as a smart deviation from the ribbed.

September prices of misses' fine gauge combed and coarse carded ribs were kept down to within a nickel of the level prior to the upward movement in yarns. Sales of the combed were made at $1.75 a dozen and of the carded at $1.05, this latter figure being five cents under what some mills were quoting for 176-needle half hose. Some mills asking $1.05 for coarse gauge ribs are holding for 7½ cents rise and a five-cent fall.

There has not been as much activity in infants' socks as was expected during the rising market. Sales thus far have been on practically the level of last year's prices. The sock manufacturers continue to compete for business and some buyers say they believe they will not have to pay advances; that potential production is in excess of what the market is absorbing.

Combed half hose is proving an exceptional proposition for several well known mills which had covered for their yarn requirements to the end of the year. One manufacturer, taking a bull view of the cotton situation, not only contracted heavily for yarn, but agreed with buyers to protect them to January next against declines in his prices. His mill booked substantial business, but it is understood that slightly higher prices will be exacted for all new business. In the circumstances they may be slow until jobbers come to piecing out for their spring requirements, of which, it is expected, there will be considerable.

Repeat orders for half hose of wool in mixture with cotton and silk still are coming forward, and fancies in such lines are promising of a profitable movement. The worsted yarn market continues in favor of manufacturers, but they are putting very little of the yarn into ladies' stockings. These may command more respect now that silk is not in good supply. If they do not respond to this situation, there will be little new business in ladies' so-called wool hosiery.

The outlook still is regarded good for ladies' silk hosiery in very light weight, the chiffons having taken a hold that, it seems, is not to be shaken off by cold weather. Women who wear furs in summer may be expected to use sheer hosiery in winter.

There recently developed a better inquiry for full fashioned silk hosiery, but manufacturers were doing little more than taking care of the orders on their books. Orders for distant deliveries were not wanted, as there was fear of cancellations, as usual, in the event raw silk did not hold at the recent prices, and a certainty of getting better prices if it did.

In several respects the hosiery market is in the seller's favor. Retailers have had a good business, operating with low stocks and depending on quick and frequent turnover. Jobbers have been operating in about the same fashion, so that there were low stocks everywhere at the beginning of the higher price market. More hosiery would be passing over the counter, it is believed, if there were a better understanding among the consuming public as to where the responsibility for exorbitant prices rests.

Complaint is common among manufacturers, and jobbers as well, that hosiery sales are being retarded by the exorbitant profit exacted by many retailers, and that herein lies the explanation for the increasing business of catalog houses and establishments selling direct to consumers through canvassers, of which the retailers themselves are the chief complainants.

A few weeks ago a retailer in Philadelphia wanted a somewhat attractive line of children's hose with which to make a special drive at 25 cents a pair. He laid his proposal before a jobber, who in turn submitted it to a manufacturer. The latter was persuaded to name a special price for the occasion and sold the hosiery to the jobber at $1.60 a dozen. The latter took but a quarter for his profit, billing the stockings to the retailer at $1.85. About the time the mill head thought he ought to be getting a repeat order he went to the store in question and paid 49 cents for a pair of the stockings which he had sold on a concession at $1.60 a dozen. They were marked "Special," and they were—specially high priced.

A jobber who had sold a bill of stockings to a retailer

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at $12 a dozen was amazed when the latter returned a half dozen pairs, stating he could not sell them, and wanted something more attractive. "What were you asking for them?" the jobber asked. Before the retailer could reply, the jobber observed the price tag—$2.50. Berating the dealer for his avariciousness, he declined to accept return of the stockings and refused to sell the dealer another number which he thought he could use. "You can sell what you have at $1.50 a pair, and that would give you all the profit you are entitled to," he told the dealer.

A Philadelphia department store featuring men's underwear was asking a dollar a garment for a line of combed goods not included in the special sale. A purchaser of four later in the day passed through another department store where the identical garments were on the bargain counter at 65 cents—four for $2.50. He invested in four, returned those bought at a dollar apiece and was $1.50 ahead of the game. Special sales at fair prices, jobbers say, usually follow no sales at exorbitant prices, and the consuming public has been educated to wait for them.

Several Philadelphia hosiery and underwear jobbers say they are impressed by the increasing number of small retailers discontinuing business. Enormous profits that some were taking down tempted many persons with a few hundred dollars capital to establish stores. But, says one who recently gave up, only the dealers with ready cash or good credit could buy at the low prices mills and jobbers were naming in competition, and could not themselves compete with those more favorably equipped financially. They were paying high rentals and had to get high prices or give up. As a matter of fact, a great many more could be spared; too many retailers was the cause of exorbitant rentals.

The September bulge in cotton caught many jobbers short of cotton underwear for the current season and confronted with higher prices for what they still must buy for spring. The situation is the worse for distributors from the fact that, according to trustworthy reports, jobbers inclining to the belief cotton would show a decline, following the crop condition report for August, had sold short of heavy weights. That there was some foundation for this appeared to be indicated in the increasing flow of repeat orders all through September. Not only were buyers placing additional business—there was persistent demand for shipments against balances of old orders, and intimation was given that mills which failed to deliver as per schedule would be expected to compensate buyers for losses sustained if there arose occasion for buying in the opening market at advances. Cancellations would have come from the same sources had cotton declined half as much as it has advanced on news of a short crop, primary market operators say.

The plight of jobbers in need of winter underwear is made the more serious by the fact that practically no dependable mill making low end cotton ribbed goods has any for immediate delivery. Buyers in the market last month declined to commit themselves when they could get no assurance of deliveries before the end of September. Now they are placing orders for goods to be shipped out this month—orders which ought to have been tendered four to five weeks ago. Scarcity of underwear bought in October for October delivery promised at the beginning of the month to be no less acute than the situation last month in relation to new business for September shipment.

Again jobbers overstayed the market, and they are

doing so in the matter of purchases for spring requirements. It was predicted by leading operators some weeks ago that jobbers who had deferred their fall commitments so long that goods would not reach them before November, would find themselves either short of stock for meeting immediate demand or left with 1923 underwear to be carried into the winter of 1924-25. "The laggards have created a bad situation for themselves," one jobber said.

Much of the winter underwear which should have been, but was not, bought not later than August now will cost jobbers more money, some manufacturers say. Mills which had completed initial orders and were getting no repeat orders and no encouragement from distributors, held production down and made no commitments for yarns which would have been bought before the August rise had buyers shown a more friendly disposition. In the circumstance it need not be surprising if a considerable number of mills are found making up new orders from high price yarn, and that, therefore, prices of their product will undergo upward revision.

It has been suspected for some time that not a few underwear manufacturers, looking for a larger cotton crop, sold short of yarns. This belief was strengthened by the eagerness of some mills to acquire yarn so soon as it began to appear that the rise in cotton was something more than a one-day performance. In fact, it is stated, the chief activity in knitting yarns about and following the middle of September was centered in the business being placed by underwear mills. The bulge in cotton, it was predicted, would uncover considerable short selling, by both manufacturer and jobber, the latter paying the penalty for withholding orders when prices were low. The assumption that manufacturers in September were caught short of yarn is especially interesting in relation to light weight underwear, a great part of which remains to be bought for next spring and summer.

One explanation of jobbers for buying so sparingly of ladies' light weights was, they feared the trend toward silk garments had taken such a hold that next year's retail sales of the knitted cotton garments would show a material decline from the volume for the current season, and that regardless of how high silk might go as a result of the disaster in Japan, the ladies will cling to it as they do to their silk hosiery. That this was simply a flimsy pretext is shown in the fact that the same jobber who sees a broader use of silk underwear is buying no more liberally of silk hosiery, which he admits is gaining in popularity, than he is of cotton underwear, which he contends is losing ground.

Most of the light weight underwear for women, there seems no doubt, was bought soon after the opening—some of it in advance of the opening. At that time last year's prices were being accepted by mills and there were sales at less than the prices of 1922. In fact, it is pointed out, until a few weeks ago certain types of ladies' standard underwear were being sold at prices which prevailed in a year when cotton was all of eight cents under the market of the present. Manufacturers wanted early business for keeping their machinery employed and opened their lines unnecessarily early, a blunder which some of them now confess was made.

Men's ribbed union suits and separate garments also were sold at and prior to the opening at less than the intrinsic value, and there was booked so much business that now there is regret among mills that they did not average up on an anticipated jump in cotton.

Jobbers got cheap cotton ribs. If the buying public next season is paying more than last summer's prices they cannot charge this item in the increased cost of living to manufacturers.

Manufacturers of bal briggan garments, who were not so precipitate as their rivals in the ribbed division, obtained slight advances over last year's prices, and jobbers bought practically as usual when it was found price resistance was of no avail. These mills last month found themselves in a position where it was possible to put prices pretty nearly where they belong. Several of the leading manufacturers of bals had sold so well ahead by the first of September that they found it safe to take their lines off the market for a time, pending definite information on which to make revisions. The Blood Knitting Co., Amsterdam, N. Y., for example, which opened at $3.62½, continued selling after advancing to $3.75, later withdrawing the line from sale, with the announcement the mill was sold up. Almost in a twinkling the underwear market, after favoring the buyer for some weeks, veered to a position where the advantage was with the seller, who, it appears, will not again this year be subject to buyer dictation.

The start of the price resisting movement directed against underwear specifically is charged by northern interests to southern jobbers, and two sellers in particular exhibit correspondence in which distributors in Tennessee expressed themselves as foreseeing 20-cent cotton, which at that time was their excuse for making no commitments for goods for next spring. Born in and bred on cotton, they were afraid of it, and their fear spread throughout the whole distributing fabric like an infection, and now the making of comparisons with last year as a price basis is for the time a lost art.

Business in sweaters and knitted outerwear generally pulled up amazingly last month, after a good start in the matter of revival in August. The more active buying is attributed to the popularity of brushed-front sweater coats and scarfs and an approach to firmness in worsted yarns on a low price level. Mills making brushed goods are fully as busy as in the halcyon days of the last few years, trying to ship goods out for the early fall consumer buying. Here, again, jobbers and retailers had deferred their commitments, and when they started the rush on mills the latter were illy prepared for it.

There developed in the last month or two fairly substantial demand for hand knitting yarns in coarse counts of worsted, intended for shaker sweaters, from which it is deduced the ladies are returning to knitting sweaters for pastime and for economy's sake. Demand thus far has been for 4/5s and 4/8s, counts for which there had been little call.

After October 1st the Michigan office of the Truscon Steel Co. will be located in their new building at 615 Wayne St., Detroit, Mich., occupying the entire second floor. The office includes a complete service organization and engineering department. This office will furnish comp'ete information, estimates and details on all Truscon Steel products, including reinforcing steel, metal lath, steel windows, steel joists, standard buildings, inserts, platforms and pressed steel parts.

Among the Knitting Mills.

W. B. Davis & Son, of Chattanooga, Tenn., which operate plants for knitting in various cities of the South, are to build a $100 000 hosiery mill at Tuscaloosa, Alabama, it was recently announced.

The Collier Mills, Inc., of Barnesville and Macon, Ga., have become associated with the William Carter Company, of Needham Heights, Massachusetts, and the name of the firm has been changed to the Carter-Collier Company, coincident with an increase in capital stock to $250,000. It is understood that the consolidation will result in an extensive enlargement of the main mill at Barnesville and also of the branch at Macon. J. C. Collier is president, and D. C. Collier vice-president and treasurer.

Felix Miller and George B. Smith have purchased the Wardlaw Hosiery Mills, at Chattanooga, and it is reported that a large sum of money will be expended for improvements and enlargements by next summer. It is stated that plans are being considered for a 6-story uniform structure, four stories to be added to the present two-story building, which will give a total floor space of 400,000 sq. ft., and increase the daily capacity to 500 dozen pairs of hose.

The Interwoven Knitting Mills, at Martinsburg, West Virginia, will erect a 100-foot addition to the present plant, according to report.

More than 30 houses for employees will be erected by the Loudon Hosiery Mills, at Greeneville, Tennessee, it is announced.

It is reported that a group of Newnan (Ga.) men have organized a $100,000 knitting mill for Carrollton, Ga., initial order for 200 knitting machines has been placed. The mill will be in operation January 1, it is expected.

The Smaltz Glove Co., Marion, Ind., has preliminary plans for the erection of a new one-story mill. F. M. Smaltz is president.

The Baker Underwear Company, Hazelton, Pa., headed by H. J. Baker, formerly of the Baker Brothers Co., Schuylkill Haven, will soon commence operations at the Hazelton plant for the manufacture of men's and boys' underwear.

The St. Claire Co., manufacturers of knit goods, New York City, plan for the operation of a mill. The company was recently incorporated with a capital of $10,000, and is headed by L. Steiner and J. R. and I. R. Hirshfeld. E. Endelman, 299 Broadway, represents the company.

The Crest Knitting Mills, Inc., New York City, have been incorporated for the manufacture of general knit goods. The concern is headed by L. Flanwig, C. Franke and E. Prussian.

The Vargish & Schmidt Knitting Mills, 613 Savoye Avenue, Jersey City, N. J., will operate a knitting mill. Frank Vargish, 410 Shippen Street, West Hoboken, N. J., heads the company.

The Gehman Knitting Mill, Bally, Pa., has begun the erection of an addition to its plant.

Bloombern Knitted Fabrics is the title of a concern recently organized in Brooklyn, N. Y., for the manufacture of knitted goods. The company is headed by M. A. Bloom and A. J. Bernstein.

The Elk Knitting Mills Co., Wilmington, Del., has been organized with a capital of $250,000 to operate a plant for manufacturing knit goods and kindred specialties. George L. Townsend, Jr., is representative for the company.

The Flag Knitting Mills, recently incorporated with a capital of $40,000, will establish a mill at Queens, L. I., N. Y. J. B. Boudin, 110 West 40th St., New York City, represents the company.

Bethlehem Knitting Mills, Inc., 298 Graham Ave., Brooklyn, N. Y., plan for the installation of additional machinery and equipment to increase capacity.

The Tailor-Knit Corporation, New York City, N. Y., to manufacture knit goods specialties, recently was organized by J. Ehrenreich and M. Sapiro and others.

Material Handling Engineering.

The reduction of the margin between cost and selling price demands that every mill executive look to every possible means for labor-saving and cost-reducing equipment. The raw material and finished product in the mills constitute a big problem that attracts the operator's interest, with especial regard to the manner of transporting and handling them. Material-handling has become an important factor throughout the country, and the study of the subject has extended into the universities and colleges.

For meeting the demands for material-handling and engineering service, and the supplying of equipmet for this purpose, there has recently been organized in Atlanta an engineering organization for serving the textile and other manufacturing plants in solving material-handling problems. This new firm is the Material Handling and Engineering Corporation, 80-82 Nelson Street, Atlanta, and is for the exclusive purpose of rendering engineering service and supplying material-handling equipment, making special surveys of individual requirements, as each case requires an especial study.

The personnel of the organization includes R. E. Walker, Jr., as president, who is a graduate of Georgia Tech, and Alvin Lovingood, also a Tech graduate, as secretary-treasurer. Mr. Lovingood is well known in textile circles, having been associated with firms serving the industry for the past twelve years. Both are experienced engineers in their present field of endeavor.

The lines handled by the company correlate as material-handling equipment, and following are the concerns represented: N. J. Foundry and Machine Co., of New York City; Mathews Gravity Carrier Corp., Elwood City, Pa.; Cowan Truck Co., Holyoke, Mass.; McKinney Mfg. Co., Pittsburgh, Pa., and the Louden Overhead System, Inc., Fairfield, Iowa.

Ralph M. Lane, of Charlotte, N. C., has been appointed southern representative for J. J. Reutlinger, 160 Fifth Avenue, New York. This firm is importing Swiss twin-wire heddles, drop wires, pickforks and papier-mache spools and bobbins. The twin-wire heddles are acclaimed as superior in quality and deliveries have been made in record time. The dropwires carried are of the finest workmanship and can be had either in dull or in velvet finish. The pickforks are made up with brass or bronze bushing, thereby insuring maximum wear. Papier-mache spools are made up in any sizes and any styles to suit the trade, likewise the bobbins. These spools and bobbins being waterproof will not be affected by moisture. Some of the larger manufacturers have adopted them as their standard make of spool or bobbin, it is stated.

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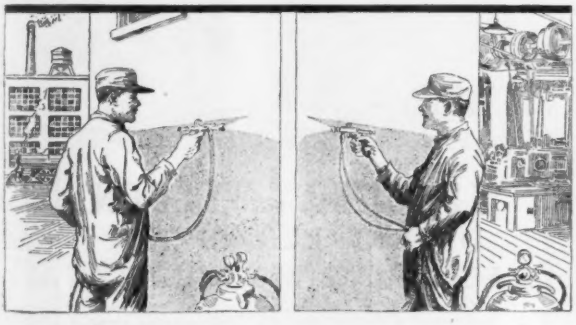

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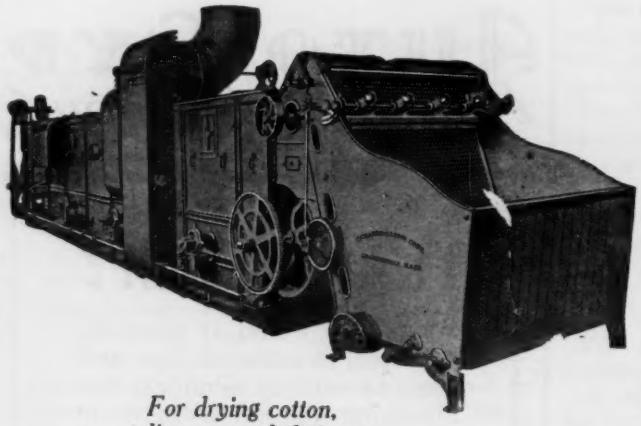

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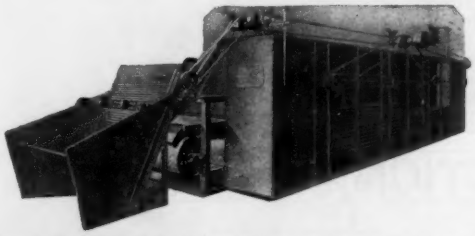

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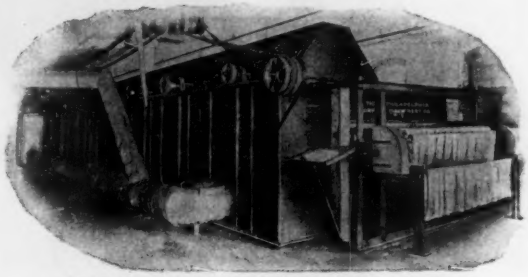

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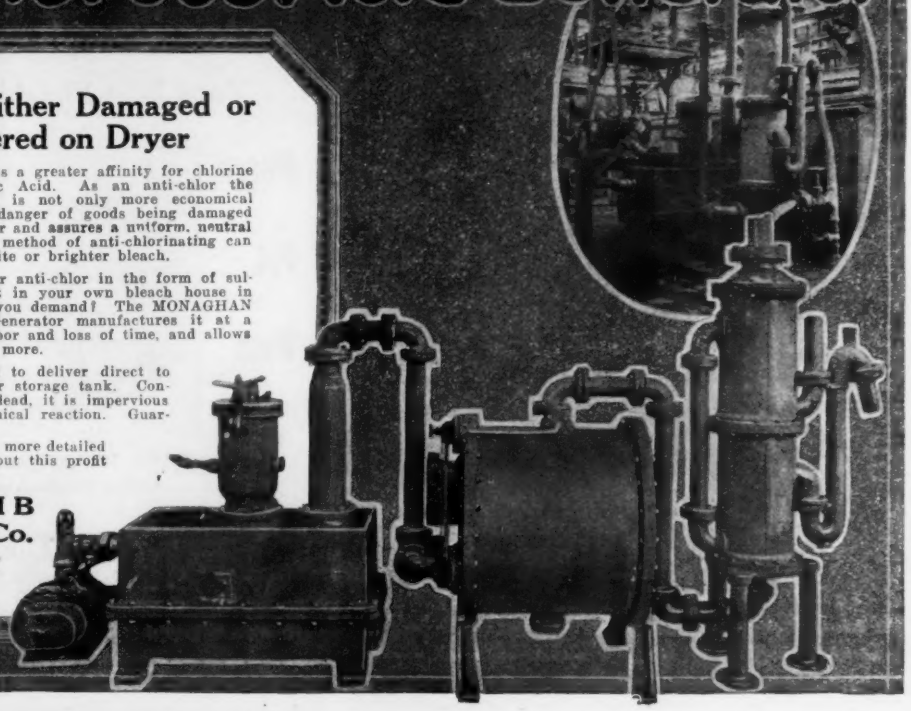
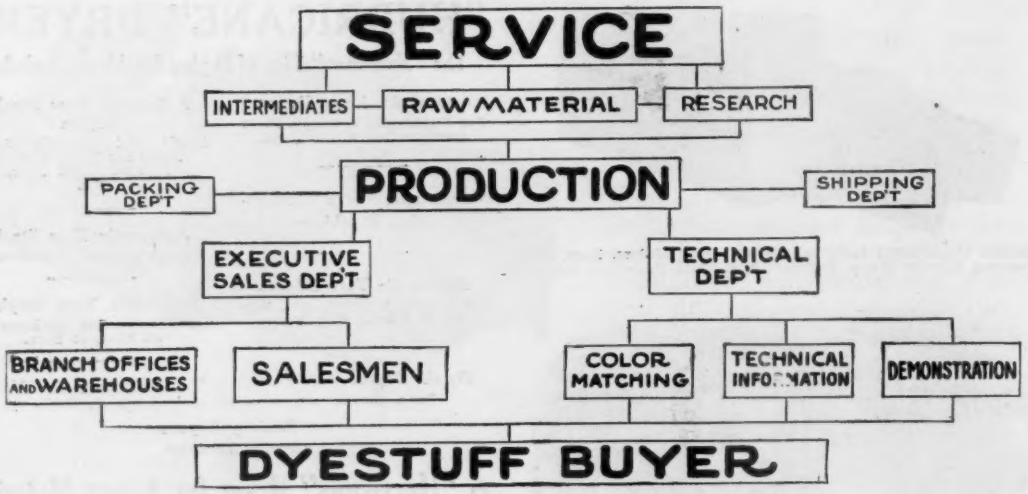
230 Newton St., Waltham, Mass.





The chart of the organization maintained for the service of

The Customer

which helps to explain the satisfaction in using our Quality Dyes

THE GRASSELLI CHEMICAL CO.

Dyestuff Department

117 Hudson Street New York

Factories at
Rensselaer, N. Y. Grasselli, N. J.

Branch Offices
Boston, Providence, Philadelphia, Chicago, Charlotte, New Orleans, San Francisco

Increases production yet cuts down labor costs

—in one mill, 4 HUMATICS took the place of 6 other extractors and reduced the number of operators by two. One man does all the work now. Write today—we'll send you full details of the HUMATIC's saving in labor, time and power.

The American Laundry Machinery Co.

Specialty Dept. C. **Cincinnati, Ohio**

The Canadian Laundry Machinery Co., Ltd., Toronto, Canada.

American Laundry Machinery Co., Ltd., London, England.

Automatic Safe!

Rodney Hunt Equipment

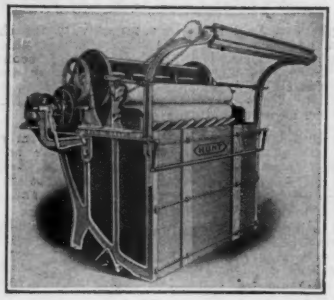
Will Solve

Your Wet Finishing Problem

Bleach

Dye

Wash



All Cotton Fabrics Woven or Knitted

MOTOR DRIVEN REEL MACHINE
(Ask for Booklet 1119)

RODNEY HUNT MACHINE CO.

47 MILL ST., ORANGE, MASS.

District Representatives
Philadelphia, Pa.; Chicago, Ill.; Charlotte, N. C.; Hamilton, Ont., Can.

FOXBORO
Automatic Temperature
Recorder-Controller
(Pat. and Pat. Applied for.)

Designed for Closer Control of Dyeing and Finishing Processes

Maintaining the one best temperature in all heating using processes means:

1. Uniform quality of product. Elimination of burned, discolored, tendered, streaky or uneven fabrics.
2. Saving steam. This item alone amounts to thousands of dollars annually.
3. Saving time in processing and reclaiming damaged materials.

The Foxboro Automatic Temperature Recorder-Controller is the only instrument that enables you to determine and maintain this one best temperature.

The Foxboro Temperature Recorder-Controller is especially suitable for installation on:

Bleaching Kiers
Size Boxes
Slashers
Dyeing Machines
Process Kettles
Steaming Boxes
Drying Cans
Scouring Bowls,
Etc.

It provides positive, accurate control and produces a continuous, permanent record of the controlled temperature throughout the process. This record makes possible the development of temperature standards for every grade of material and then provides definite proof that these standards are maintained.

Every Foxboro Recorder-Controller is built and tested to insure years of dependable service.

Let us tell you more about the Foxboro Recorder-Controller and the possibilities for making savings in your mill.

Write for Bulletin AS-112-1.

THE FOXBORO CO., Inc.

FOXBORO, MASS. U. S. A.

New York Chicago Boston Philadelphia Pittsburgh
Cleveland Rochester Tulsa
Los Angeles San Francisco Portland, Ore.
Birmingham, Brown-Marx Bldg.

5786

FOXBORO
REG. U.S. PAT. OFF.
THE COMPASS OF INDUSTRY

Performance

F. A. STRAUS & CO., INC.
YARNS
TRENTON, NEW JERSEY

March 27, 1923

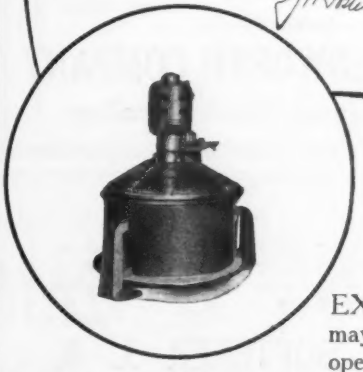
Fletcher Works,
Phila., Pa.

Gentlemen:-

In reply to your enquiry as to how we like the vertical driven extractor purchased from you in June 1922, beg to say that we have not had the least bit of trouble with it in any way, shape or form, and is running to-day as well as the day it was started up. We are very much pleased with same and very glad to give you this testimonial.

Very truly yours,
F. A. Straus & Co., Inc.

JWFoster.



Under all conditions of performance FLETCHER EXTRACTORS may be expected to operate without the least bit of trouble, and to run for years as well as the day when started up.

For fifty-nine years we have been building all types of extractors. Our experience is your assurance of a satisfactory, dependable and efficient installation.

Illustrated circular with full technical description sent upon request. Write for your copy.

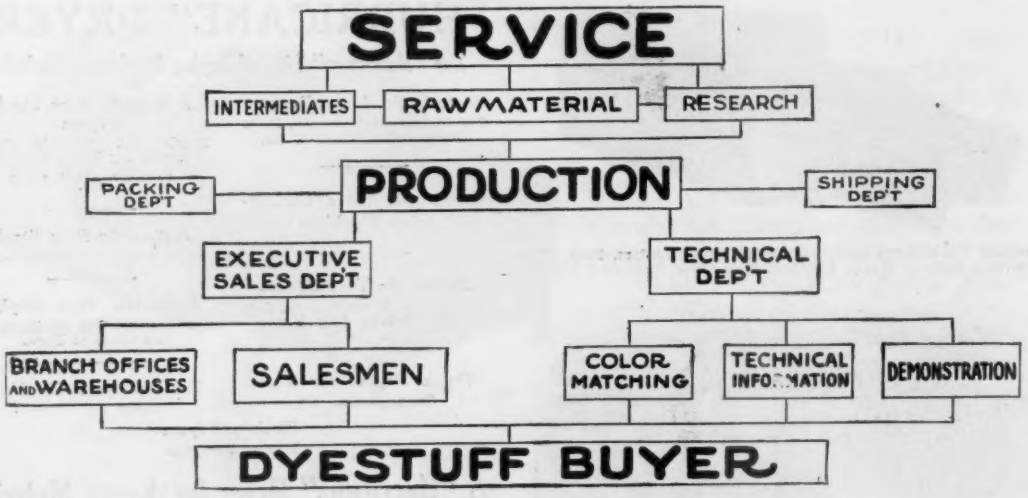
FLETCHER WORKS

Formerly SCHAUM & UHLINGER

Glenwood Avenue at Second Street

PHILADELPHIA, U. S. A.

Chicago, Ill.
Boston, Mass.
Charlotte, N. C.
Los Angeles, Cal.
San Francisco, Cal.
Portland, Ore.



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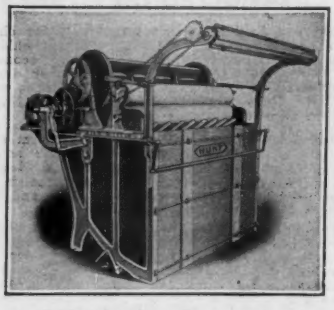

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Glenwood Avenue at Second Street

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Rohm & Haas Company Inc.

Manufacturers of

CHEMICALS

PHILADELPHIA, PA. BRISTOL, PA.

SODIUM HYDROSULPHITE—
Sulphoxylates and Allied Products.

LYKOPON—Sodium Hydrosulphite—
For reducing Indigo and vat dyes. Of highest quality and absolutely standard.

FORMOPON—For discharging.

FORMOPON EXTRA—For stripping.

PROTOLIN—For stripping.

INDOPON W—Indigo Discharge Assistant.

TARTAR EMETIC—Technical.

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina

Chas. Lennig & Company

Incorporated

40 North Front Street Philadelphia, Pa.
Works: Bridesburg, Philadelphia, Pa.

Manufacturers of

Concentrated Sodium Sulphide
Crystal Sodium Sulphide

Also manufacturers of the following chemicals:

ALUM	GLAUBER SALT
SULPHATE OF ALUMINA—	OIL OF VITRIOL
Iron Free	NITRIC ACID
PAPER MAKERS' ALUM	MURIATIC ACID
WATER FILTRATION ALUM	NITRATE OF LEAD

Represented by

The MAKENWORTH COMPANY
Greensboro, North Carolina

FOR that silky, soft "kid glovey" finish on fine shirtings, sheer nainsooks, dainty organdies, and voiles, on high grade ginghams and sateens, use

CREAM SOFTENER J. B.

White goods stay white and even the most delicate shades are not affected by this creamy, white softener.

A finish cannot always be judged satisfactory immediately after it is applied. Father Time, the most critical judge often makes an advrse decision after the goods have been on the shelf a few months.

Our Cream Softener J. B. is especially adjusted and standardized to cope with atmospheric, storage and other conditions to which material is subjected after finishing.

We guarantee this softener will not cause any regrets. The first and last decision will be favorable.

Allow us to send samples.
The product will prove itself.

JACQUES WOLF & CO.
PASSAIC, N. J.

Uniform in Application

VICTROLYN

Penetrating, Lubricating, Dependable Assistant in Warp Sizing

KLORASENE

will remove Oil Stains.

If you are troubled, write us.

BOSSON & LANE
Manufacturing Chemists
ATLANTIC, . MASS.

"ARTCO" SILK OIL

for

use on Artificial Silk

Hosiery and Sweater Knitters find "ARTCO" Silk Oil to be the best product for this purpose.

Prevents waste and saves time

Softens the Thread and lays the Fibre, and produces a Fine Lustre.

Samples and full information on request.

Manufactured only

by

QUAKER CITY CHEMICAL COMPANY

Broad and Lehigh Ave.
Philadelphia

"BRETON"

MINEROL "F"

For Plushes and Velvets

"It gives an oily sheen"

BORNE, SCRYMSER CO.

Established 1874

17 Battery Place, NEW YORK

BOSTON **PHILADELPHIA**

Works: Elizabethport, N. J.

Established 1815

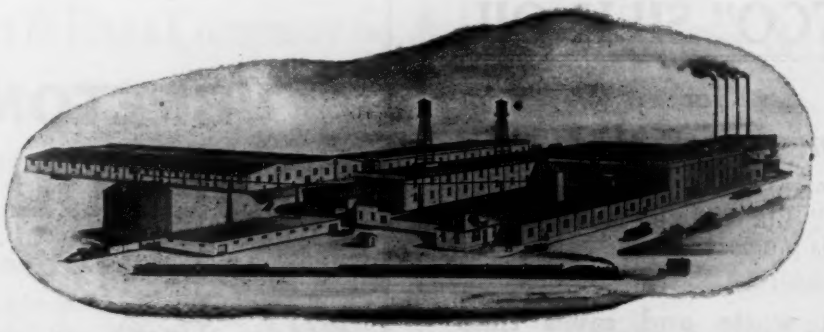
ARNOLD, HOFFMAN & CO., Inc.

Providence New York Boston Philadelphia Charlotte

Oldest in Years. Youngest in Spirit
Modern in Ideas. Progressive in Methods
"Service" Our Motto

All kinds of
Warp Dressings, Finishing Materials, Soaps,
Soluble Oils, Etc.

Please Submit Your Problems to Us



VICTOR MILL STARCH

The Weaver's Friend

It boils thin—it penetrates the warps—increases breaking strength and carries the weight into the cloth. Being thoroughly washed free of gluten and other foreign matter it gives a bleach and finish to the goods that you can get from no other starch.

A trial order will convince you that VICTOR STARCH has no equal on the market.

THE KEEVER STARCH COMPANY, Columbus, Ohio

Southern Agent: MR. JAMES H. MAXWELL, Greenville, S. C.

If you are not already using VICTOR STARCH call on our representative for a demonstration at your convenience.

You can be sure of a hearty welcome at the

WYANDOTTE BOOTH

431, DEPT. E.

INTERNATIONAL TEXTILE EXPOSITION

Mechanics Building, Boston, Mass.
October 29 to November 3

We know that a visit to our exhibit will interest—
We believe that it will prove profitable also.

The J. B. FORD CO., Sole Mnfrs.,
WYANDOTTE, MICH.

SAVOGRAN

Used Where Only The Best Cleaning Material is Wanted
Try It And Check Results
"ASK YOUR SUPPLY HOUSE"

India Alkali Works, Boston

The Original GUARANTEED Comber Duster

Perkins Practical Comber Dusters were the original guaranteed Comber Dusters. They are the most reliable and complete line being presented to Textile Mills. They are made to fill cotton mill needs; that is why mill men of the South favor them over all others.

Here are two of our best Comber Dusters:

No. 191 COMBER DUSTER—"Perkins Practical." This is the most popular duster we make. It has exactly the right mixture of bristle and horsehair to get the best results. Is made on hardwood handle with pegged solid back construction. Length over all 13½ inches, brush part 5½ inches.

No. 292 COMBER DUSTER—This duster was developed by us to fill a demand for a brush that would not mat and that did not have the flare found in horsehair brushes. Those who use it tell us that it is ideal for close work around belts, etc. Same construction and specifications as No. 191, except stock is bristle.

Order by Number

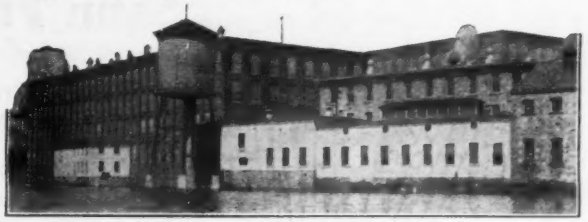
ATLANTA BRUSH CO.
ATLANTA, GA.

ATLANTA BRUSH COMPANY

A Brush for every Textile Need

Electric Scrubbing!

Reduces Soilage and Spoilage in Textile Mills



One of the Mills of the American Thread Co.

The example of the American Thread Company and several hundred other mills may be profitably followed by all mills. No matter what the size or location may be, a mill is better equipped to turn out a perfect product efficiently and economically if floors are kept thoroughly CLEAN with the FINNELL System of Electric Scrubbing. There is a FINNELL outfit of the proper size for every mill.

Once installed, it keeps floors cleaner than hand-and-knee scrubbing ever could. It saves money by requiring less time and labor. It lessens the possibility of spoilage through soilage.

No textile mill can afford to allow a condition of dirty floors. Cleanliness under foot is highly essential if employees are to work at highest speed and effectiveness.

If you wish to see exactly how the FINNELL System operates write us, asking our representative to bring his projector to your office and show you our motion picture film.

Free Booklet

"Electrical Scrubbing," a small booklet, will be sent to any executive on request together with our latest broadside containing large pictures and full description of FINNELL equipment in various sizes. Address

AMERICAN SCRUBBING EQUIPMENT SALES COMPANY
General Offices and Factories
510 COLLIER STREET HANNIBAL, MO.
District Offices in Principal Cities

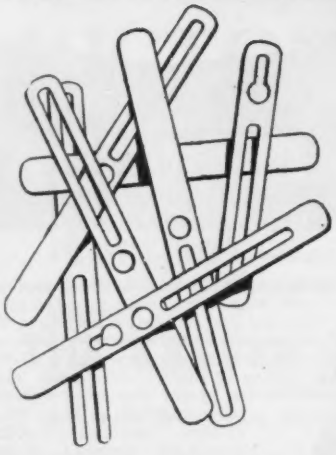
FINNELL SYSTEM
OF ELECTRIC SCRUBBING

"Clean Floors Reflect Clean Business"

Make a note to have your representative visit our exhibit at the Boston Textile Exposition on Oct. 29 to Nov. 3rd.

Power Scrubbing Headquarters for Seventeen Years

GREIST



Satin Finish Loom Drop Wires
are *Good Wires*

Uniformly made—free from burrs.
A reliable source of supply.

The
Greist Manufacturing
Company,
Dept. "C"
New Haven, Conn.

Southern Representative
SLAUGHTER-McCABE COMPANY, INC.
GREENVILLE, S. C.

THE
"Southwestern" Iron Clad
Is the IDEAL Cotton Mill Broom

Only the best grade of broom corn is used in these brooms—they are built strong and will withstand the hardest usage.

The light weight, yet strong and substantial shields used gives the broom ample protection and at the same time allows the proper amount of broom corn to be used, thus giving them excellent sweeping qualities.

MADE RIGHT!
PRICED RIGHT!

Inquiries and orders receive prompt attention.
Sold direct and through
all principal distributors.

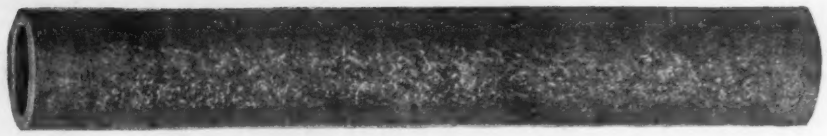
The Southwestern Broom Mfg. Co.
Evansville, Indiana

AMERICAN
SUPPLY COMPANY
PROVIDENCE, R. I.

Manufacturers of

LOOM HARNESS,
WEAVING REEDS,
OAK TANNED LEATHER
BELTING, STRAPPING,
ETC.

We make a specialty of Harness for Warp Drawing Machines



Make the most of it!

When a shipment of cotton enters your mill, the orders, in every department, must be, "Make the most of it!"

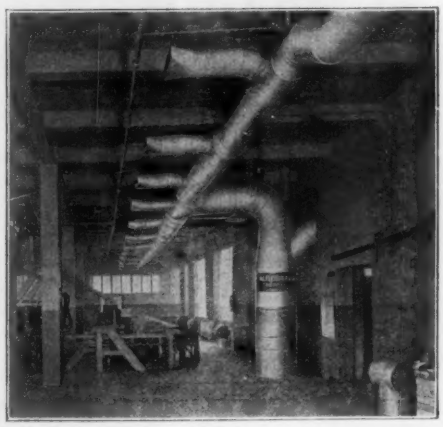
In the Winding Room, only "Sonoco" Cones and Tubes can "make the most of it," because their Unvarying Accuracy, True Balance and Unique Surface are products of our exclusive methods of manufacture.

"SONOCO"

Cones, Cores, Parallel Tubes

Southern Novelty Co., Mfrs. Hartsville, S. C.

Sonoco Products Co., Successor



Engineering

Placing your problems in the hands of this organization, gives you the benefit of all the experience of the foremost engineers in the country on air conditioning systems.

These specialists who are nationally known and recognized, have made air conditioning their life study.

They will be glad to refer you to an installation near you or give you the names of concerns in your own business who have successfully installed our air conditioning systems. You may then get in touch and understand why Sturtevant-Fleisher Systems are preferred.

Whatever your problems or conditions, these engineers who have installed hundreds of systems all over the country, will be glad to cooperate with you.

Atlanta, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Hartford, Los Angeles, Minneapolis, New York, Philadelphia, Pittsburgh, Portland, Rochester, St. Louis, Salt Lake City, San Francisco, Seattle, Washington

Sturtevant

PUTS AIR TO WORK

HYDE PARK, BOSTON, MASS.

W. L. FLEISHER & CO., Inc.

31 Union Square West

New York, N. Y.

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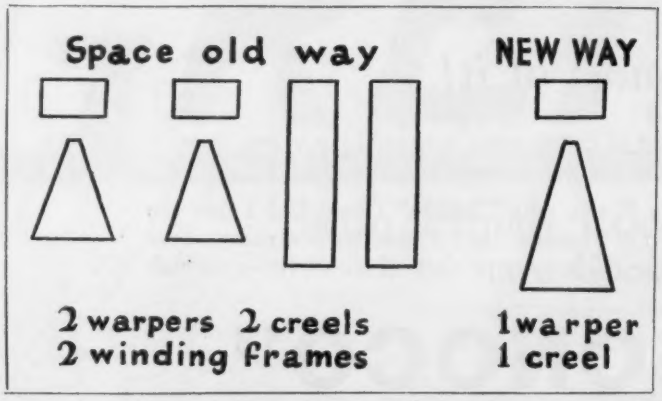
NEW AUTOMATIC CREEL

for direct warping from FILLING WOUND BOBBINS



COMPLETELY ELIMINATES the

Spooling of the yarn

Spooling waste

Undue and irregular tension of yarn due to spooling

Stoppage for doffing

Doffing is done while warper is running.
Greater production from better warps at lower cost.
Better loomage from auto-creel warps because
Elasticity is preserved in yarn.

For Information address

AUTO CREEL CORPORATION, NEW YORK

Room 915, Fifth Ave. Building
Alfred Suter, Sales Manager

TRADE MARK

LOWELL MILL CRAYONS

the original crayons for textile mill use, and for years the standard with America's leading mills.

Lowell Crayons are made in white and 15 colors, as follows:

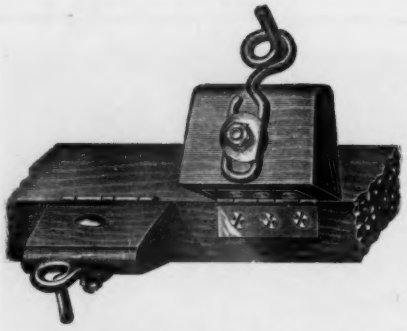
1 Yellow	2 Red	3 Pink	4 Blue	5 Purple	6 Brown
7 Black	8 Green	9 Orange	10 Dark Green		11 Light Red
12 Rose Pink	13 Light Green	14 Light Blue	15 Orange No. 2		Wh.

Order by number, please.

LOWELL CRAYON CO.

Lowell, Mass.

The Palmer Adjustable Thread Guide



For Ring Spinning and Twisting Frames

Easily Adjusted.

Extreme accuracy and permanence of setting.

Cheapest of them all.

Mail guide-block for free sample.

Patented and manufactured by

THE I. E. PALMER COMPANY

Middletown, - - - Connecticut

VERMONT SPOOL & BOBBIN CO.

OF

BURLINGTON, VERMONT.

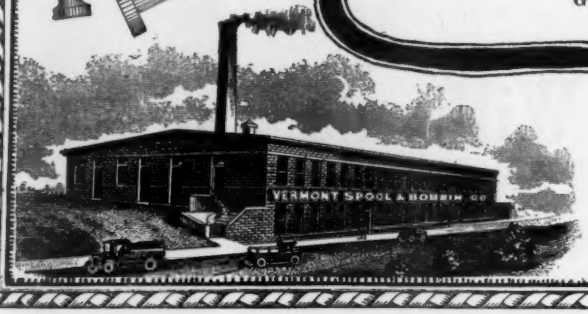
There are two prime requisites in the production of superior bobbins and spools—the plant and long experience. We have both.

Our plant is equipped with the most up-to-date and efficient machinery. From the selection of the wood to the finishing of the product the same care is exercised in every department—uniform bobbins and spools of the highest class being the result.

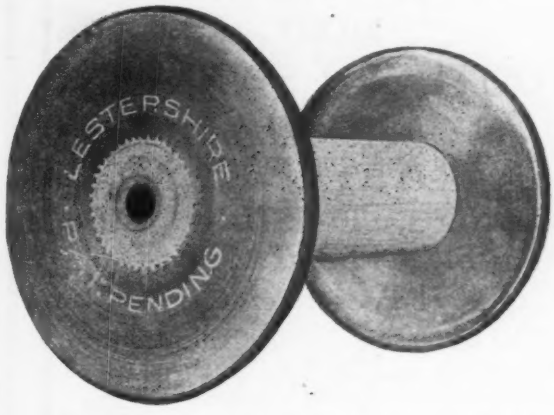
Our long experience in the design and manufacture of spools and bobbins for textile mills all over the country enables us to understand your requirements and give you 100% satisfaction.

Give us a trial order and you will remain one of our satisfied customers. Write for prices.

"Good Goods at Fair Prices."



What Part of the Spool is First to Wear Out?



Your superintendent will confirm our statement that 99% of all Warper, Twister or Spooler Spools become useless on account of the heads breaking, wearing rough or loosening. This is true of all types of Spools heretofore on the market.

With the Lestershire Type Vulcanized Fibre Head Spools just the opposite is true. The Heads will outwear the barrels because Hard Vulcanized Fibre (the same material from which end thrust bearings and automobile gears are made) will never break, wear rough nor splinter.

Of course the first cost is higher but, figuring your charges per thousand spools per year, they are by far the most economical spools on the market today.

In addition Lestershire Fibre Head Spools will in the ordinary mill give you an increased unloading production of nearly 50%. Put a row on your creel and compare the time necessary to unload with any other type Spool.

On the smooth Rock Maple barrel, cleanly jointed to the Fibre Heads which cannot get rough and cannot be dented, there is no place for the yarn to catch.

Spindle wear is also eliminated by bushings of hard well seasoned Dogwood.

Increased traverse can be had which will give you greater yardage on your spools. This means a saving of many dollars in the course of a year, not only direct but in labor required to change the spools.

At your request we will gladly send samples for purposes of test and comparison.

LESTERSHIRE SPOOL & MFG. CO.

Manufacturers Mill Spools, and Bobbins, of Every Description

General Offices and Factory
JOHNSON CITY, N. Y.

Southern Branch Office:
32 So. Church St.,
CHARLOTTE, N. C.

Quality Shuttles

An appreciation and knowledge of weaving problems is sure to result in a shuttle that is at once dependable and durable.

The close attention that we give to the little details, as well as the big points, permits our shuttle the greatest utility possible. Our workmen are skilled, highly paid and they feel a personal responsibility for every piece of work they put out. Quality is the watchword, not the Catchword to be used in selling and forgotten when shipping. May we serve you?

The J. H. Williams Co.

The Shuttle People

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MORE
SOUTHERN SPINNERS
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"AMTEX"
SPINNING, TWISTING AND SPOOLER TAPES
Than ever before

This increasing demand indicates the superiority of AMTEX Tapes over all others.

We are pleased to build special Tapes for your particular needs.

Send us your specifications and we will guarantee satisfaction.

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We make a specialty of all Metal reeds, for Tire Fabrics, and Leno work.

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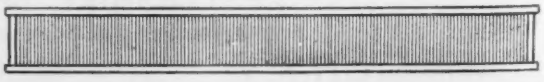

WILLIAMS
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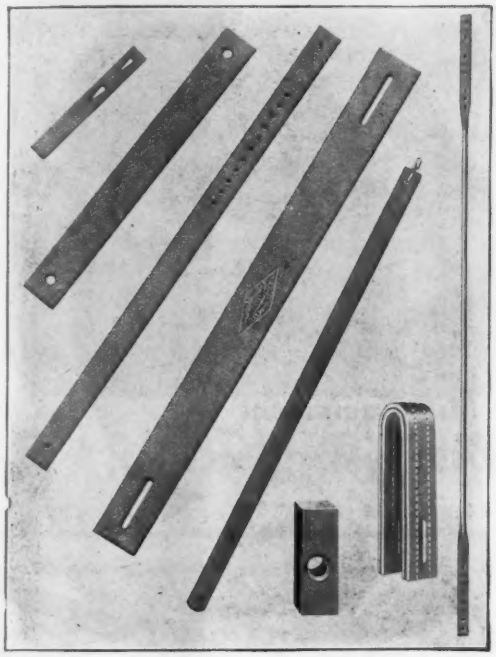

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Mill men everywhere are learning that Williams' straps are different from the usual kind. Better leather, more careful expert workmanship, all combine to produce real quality. They cost no more and give greater service than has ever been possible, heretofore.

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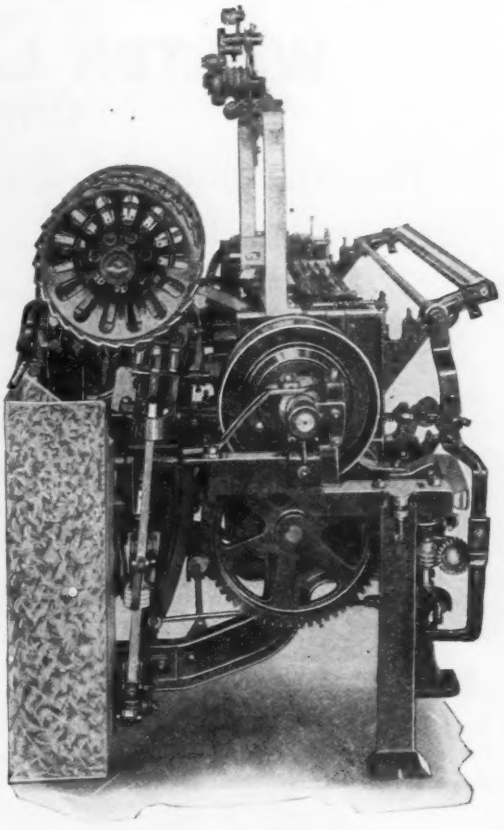

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NORDRAY
Automatic Loom

Multiple-harness, Feeler type

built by

HOPEDALE MANUFACTURING CO.

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SOUTHERN OFFICE at GREENVILLE, S. C.

This loom was shown at the Late Greenville Exposition and excited great interest.

It is Still the Simplest.

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Manufacturers of Bobbins, Spools and Skewers

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Are made to stand severe service and are made from thoroughly dried stock, so constructed that they are giving entire satisfaction.

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Are made from the best grade of stock, and through the efficiency of our workmanship, are true running, and properly fitted on spindles.

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Bobbins—Warp and Filling. We put on all kinds of metal shields and caps.
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Our Metal Bound Spools are pronounced the best on the market.
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We Specialize in New Mill Equipment

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Seasoned Textile Buyers Specify Lewis Boxes—

Because thirty years of experience has proved that Lewis shipping boxes, hand baskets and trucks give longer service, are light yet strong, easier to handle and repair, maximum in economy and satisfaction.

Write for specification sheets fully describing and illustrating the Lewis line for textile mills.

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Have Them Repaired. We are equipped for renecking, refluting, stoning, honing, polishing. We place your rolls in first-class condition, at a small cost.

Write us regarding what we can do to increase the output of your mill by overhauling and repairing your machinery.

Southern Spindle & Flyer Co., Inc.

Manufacturers, Overhaulers and Repairers of Cotton Mill Machinery.

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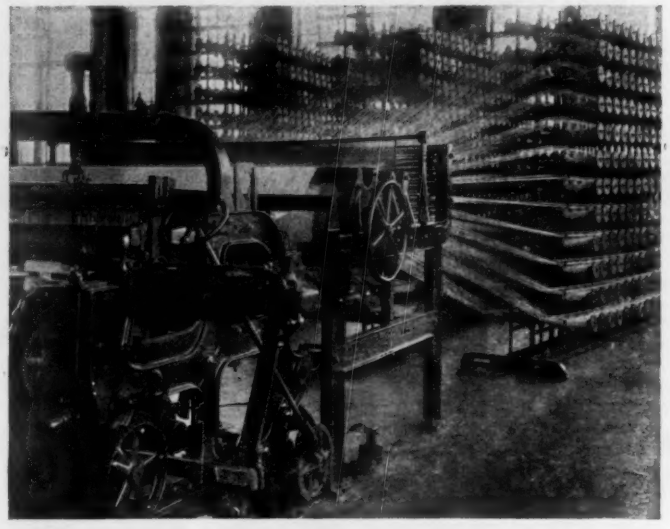


WEAVING-DIRECT OUTFIT for cord, and special fabrics.

WARPER CREEL and TENSION DRESSER, shown in connection with the loom for weaving cord fabric.

WARPER CREEL built in stationary and heavy base models.

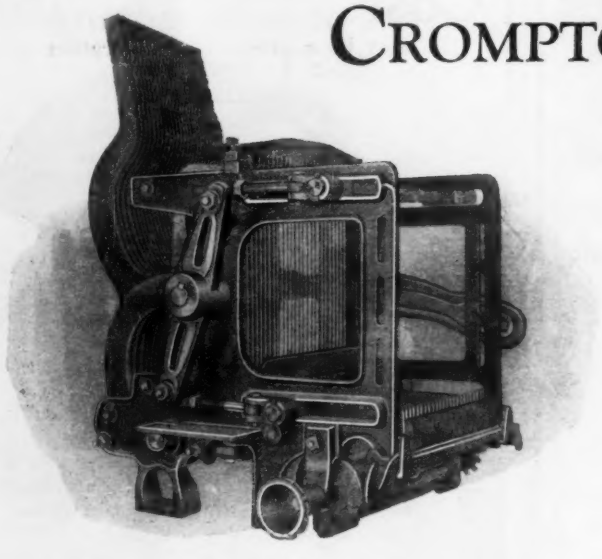
Standard spacing 6″ x 6½″ for maximum 5″ x 8″ spools or tubes. Special spacing to mills' requirements.

UNIFORM TENSION from WARPER CREEL to loom.

Highest efficiency test in your goods. PRODUCTION plus QUALITY.

WARP COMPRESSING MACHINE CO. Worcester, Mass. U. S. A.

Representative: F. W. KIESSLING, *Worcester, Mass.*



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NEW FEATURES OF SPECIAL INTEREST TO WEAVERS AND FIXERS

1. Built with slotted fingers and locking rod (patented), making it easy to remove, clean and replace the fingers.
2. We are now prepared to equip the dobby shown above with pressed steel jack backs and drop forged top and bottom hooks.
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4. This dobby can be applied readily to any make or type of loom.

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remember that it costs no more to use

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and have the assurance that you are getting the best there is.

Thirteen large modern plants, located favorably for serving the market in all parts of the country, are at your service, and this means more prompt delivery and perhaps added convenience.

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for the best doff baskets, storage baskets and distributor baskets. When they are apparently worn, slip on a new cover, and you have a basket as good as new.

The sturdy frame of SMITH'S 100% BASKETS is constructed of steel—practically indestructible—and has cross slats and skids of wood.

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Cost

may be a primary consideration

The Liberty Knotter

not only fills the requirements of low first cost but is most simple in construction and economical in upkeep and operation. Give it a trial.

Guaranteed for one year

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106 Sales Rooms and Service Stations in the United States and Canada. Others in thirty-four foreign countries

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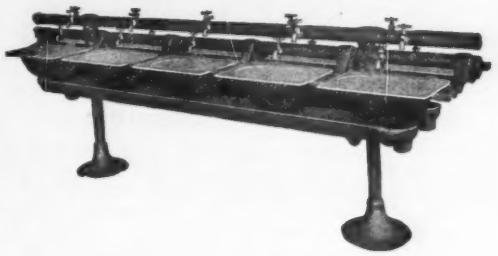
Have Cut Production Costs in Every Mill Where They Have Been Installed. Let Us Send You Proof



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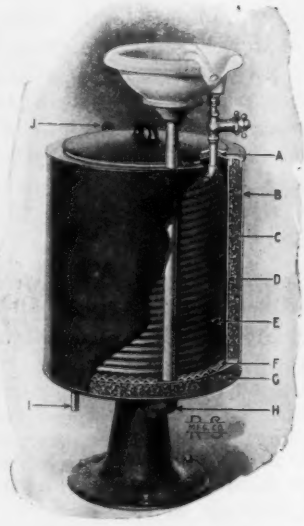

Think how much time one man can waste in frequent trips to a hydrant or pail for drinking water. Can you afford to lose this much of their time and efforts when

RUNDLE-SPENCE "VERTICO SLANT" Fountains

will bring cold, invigorating drinks to every worker AT HIS JOB? Install them throughout your mill—the investment is small compared to the saving in time and efficiency.

Note the sanitary features of the R. & S. Fountain. The stream is thrown at an angle, preventing germ-laden water from falling into the jet. LIPS CANNOT TOUCH THE NOZZLE. Don't delay—send for our new 73-page catalog. There's an R. & S. Fountain for every mill and office use.

Rundle-Spence Mfg. Co.

Milwaukee, Wis.

Leaders in Plumbing Equipment Since 1871

Attractive *Sanitary*

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Permanent *Economical*

TOILET PARTITIONS
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DOORS
BINS

"Mills Metal" Products are permanent investments, and their design makes them the most adaptable products of their kind for textile mill use.

"Slant Lip Diamond Rail Top and Bottom"

Constructed entirely of the highest quality rust-resisting steel. Finished in Olive Green or Gray Baked Enamel.

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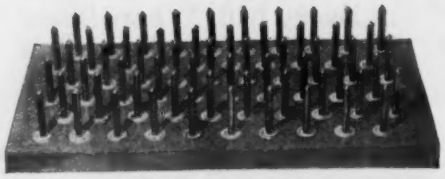
THE MILLS COMPANY

Dept. A, **Cleveland, Ohio**

KORE-LOKT PIN BOARDS

REG. U. S. PAT. OFFICE



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Are You Responsible

for good weaving in your mill? If so, you should know Kore-Lokt Pin Boards and the story of their usefulness in modern loom equipment.

Expert Opinion from men in charge of the weave rooms in prominent mills is available to superintendents and overseers upon request.

Send for this information so you may know the merits of Washburn Kore-Lokt Pin Boards as an improvement over old style Filling Boxes. Learn how the other fellow checks up results from the "Build of Bobbins."

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PERFECTION SHELL ROLLS

FOR

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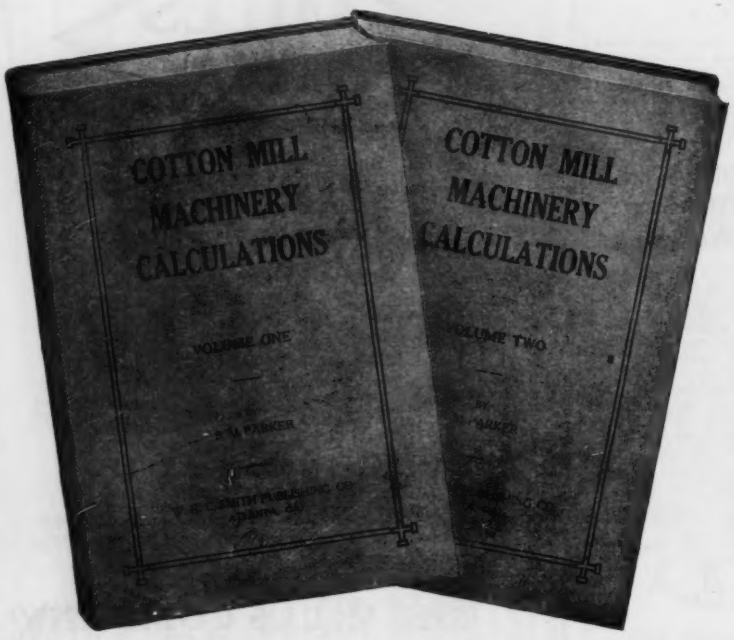
CORD FABRIC SHIPMENTS

NEW BEDFORD, MASS.



EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on this subject obtainable.

The two volumes are illustrated with 45 diagrams and contain 21 reference tables.

As the value of a book lies in its contents and not in a fancy cover, we have put these two volumes out in a strong, serviceable paper binding. You can secure them in conjunction with a subscription to COTTON.

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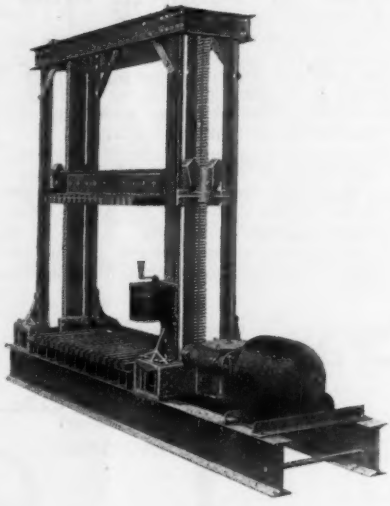

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Speed, Strength, Simplicity

Built any size and pressure.

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To build a press so good that the simple truth about it will be adequate recommendation and to price it so fairly that its value can never be questioned.

Watch for the Yarn Press.

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Conn Instruments Make a Successful Band

REMARKABLY easy blowing combined with their superior quality of tone, perfect scale, and reliable action make Conn instruments the best for factory, institution, and community bands, just as they are for the great professional concert bands and symphony orchestras.

Complete equipment of Conn instruments insures rapid progress and gives a harmonious tonal effect obtainable in no other way. The world's great soloists and conductors join Sousa in endorsing the quality of Conn instruments and the exclusive features which make them easiest to play.

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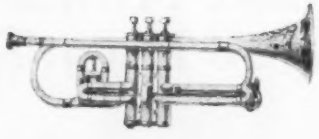

Conn will gladly help organize a band or orchestra for you. Our experience of half a century in building instruments and assisting in the organization of bands is at your service without obligation.

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Permanently Linked With the Interests of Southern Mills

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THE L. C. SMITH & BROS. TYPEWRITER binds its friends by chains of service. It gives lasting satisfaction and makes lasting friends.

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For TEXTILE MILL FLOORS especially, this "Hard-Wear" Lumber makes good always---and in

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Wheels and heels have the effect of making it smoother and solider and denser. That's "some" merit.

Get the complete facts about TUPELO before placing an order for Flooring for any use. They're interesting and convincing. Write.

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Increases Productivity of Industrial Property

Wherever you find big industry, you also find Cyclone Fence. For those keen-minded, farsighted business men, who are writing America's industrial history, were the first to see the advantages of safeguarding property; the possible economies by preventing losses through thefts and vandalism; the greater productivity of a centralized, easily controlled factory unit.

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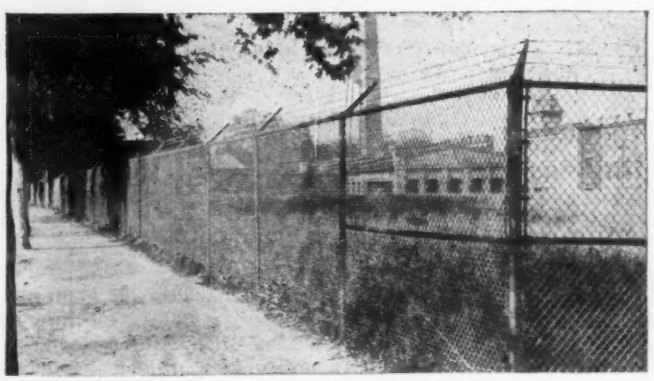
Let Cyclone Fence and Cyclone Service combine to bring about this greater productivity in your factory. Write nearest office, Dept. 35, today and get complete information.



Cyclone Invincible Chain Link Fence Enclosing Property of International Cotton Mills, LaGrange, Ga.

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Factories and Offices: Waukegan, Ill.; Cleveland, Ohio; Newark, N. J.; Fort Worth, Texas; Oakland, Calif. (Standard Fence Co.); Portland, Ore. (Northwest Fence & Wire Works).

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Textile Mill Equipment

All At Bargain Prices

Cotton Dryers

25—Sargent No. 24 six section 8 foot Cotton Dryers. Overall dimensions 99′4″ long, 15′5″ wide, 7′10′ high. Equipped with Model "M" Self feeder. Hot air drawn through belt by 33″ exhaust fans. Constructed throughout of metal angles and plates.

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25—Sargent Cylindrical type 48″ Mixing Pickers. Equipped with single pair fluted feed rolls, 3½″ diameter. Cylinder provided with 6 heavy steel bars on lugs bolted to spider. Capacity 600 to 800 lbs. per hour.

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25—Sargent 48″ Special Cotton Washers or Rinsers. Complete with cast iron frame, pans, squeeze rolls, kicker and conveyor.

Feeders

25—Sargent 48″ Model "M" Feeders for Sargent Dryers.

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8—Noble and Wood Concentrators right and left hand cylinder washers with octagon cylinder diameter 44″, length 42″. Rotates at 6 R.P.M. Vat is 1′4½″ wide, 6′9″ long, 2′9″ high.

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65—42″ American Tool and Machine Co. Centrifugal Wringers. Complete with 42″ perforated steel basket shell, with steel top, basket 22½″ inside depth, ⅜″ steel Wringer direct connected to 40 H.P. Motor.

18—Sets 36″ American Tool and Machine Co. Belt Driven Centrifugal Wringers. Each set arranged in batteries of three.

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40—Welded Steel Digesters. Capacity 1300 cu. ft. Inside diameter 8′, length overall 27′. Complete with cast iron supporting ring, false bottom, hoppers, guides and all accessories.

823 H.P. Boilers

36—823-H.P. Stirling Boilers. Class M-30, complete with all accessories. Babcock & Wilcox Co., New York, makers. 200 lbs. pressure, 630 3½-in. tubes, No. 10 gauge, 150 of these tubes are circulators. Steam drums, double riveted, double strap butt join', 1-in. rivets. Thickness shell plate and tube ends in steam drums ⅞ in. mud drum 1 in. Space occupied by boiler 18 ft. by 22 ft. 3 in. by 29 ft. 9 in. high. Complete with all accessories.

350 H.P. Engines

18—Corliss Engines. Maker Allis-Chalmers Co. 350 H.P. 18 in. x 36 in. double eccentric, semi-high speed, 125 R.P.M., simple Corliss belted type, designed to operate on 140 lbs. steam pressure with 1½ lbs. back pressure. Double eccentric allows cut off up to 75 per cent of stroke. Flywheel 11 ft. diameter by 32-in. face. Complete with Phoenix individual oiling system. Type R, size 30, made by Richardson-Phoenix Co.

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225—Slightly used Motors 7½-75 H.P. 3 Phase 60 Cycle, 440 Volt.

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1000—Steel Tanks, 100-55,000 gallon capacity.

350—Wood Tanks, New and Used

Size	Capacity
12′6″ x 11′	10150 gal.
12′6″ x 18′	16600 gal.

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500—Howe and Fairbanks Scales. Capacities 600 lbs. to 100 tons. Guaranteed to be in good condition.

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Pulleys	Shafting
Pillow Blocks	Drop Hangers
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Floor Brackets	Floor Stands
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OLD HICKORY POWDER PLANT

JACKSONVILLE, TENNESSEE

B. P. MORSE and W. P. SMITH, Receivers.

Satisfaction and Economy

not only initially but in the years to come, result from a roof applied by

"Dixie's Reliable Roofers"

For over 42 years we have concentrated our efforts on roofing problems of all kinds. Our roofing experts are at your service in solving your problems, large or small.

Here are a few of the textile mills whose roofing problems have been solved by our specialists and whose roofs have been "Done by Murphy."

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Wood Preservatives, Stains, All colors Metallic and Composition Paints

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Makes all surfaces—wood, metal or composition — moisture proof; rust proof; rot proof.

Adds years of serviceable life to every part of the mill. Best of insurance against replacement or repair costs.

Used and recommended by Industrial Plants and Cotton Mills, everywhere.

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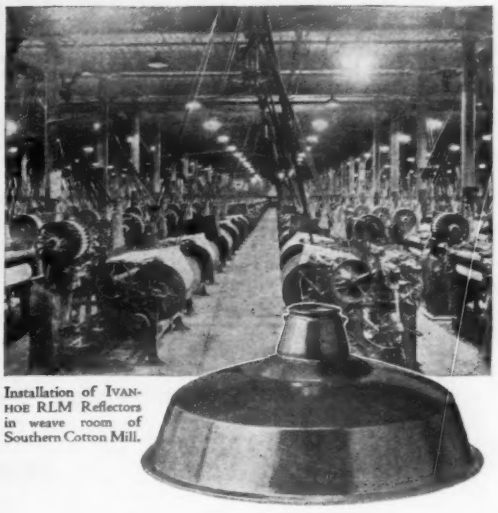
Our Application Department will be glad to give you estimates on applying new roofs. **Our service Department at your call—any time—anywhere.**



Installation of IVANHOE RLM Reflectors in weave room of Southern Cotton Mill.

This is Good Textile Mill Lighting

An engineer who spent many months studying textile mill lighting set down these five requirements which the lighting must fill before it can be called "good".

1. **Adequate illumination on the work.**
2. **Freedom from objectionable shadows.**
3. **Freedom from glare.**
4. **Light from the proper direction.**
5. **Light of proper color quality.**

Five requirements. And four of them depend on the *proper choice* and location of the reflectors.

The IVANHOE RLM reflector fills the bill on every point. That's why it helps so greatly in production; decreasing spoilage and improving quality.

Near you is an IVANHOE distributor trained to meet lighting requirements of mills like yours. Get his advice. If you don't know his name and address, we'll give it to you together with a booklet, "How Good Lighting Cuts Factory Costs".

IVANHOE-REGENT WORKS
of General Electric Company
Cleveland, Ohio

IVANHOE

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VOGEL PATENTED

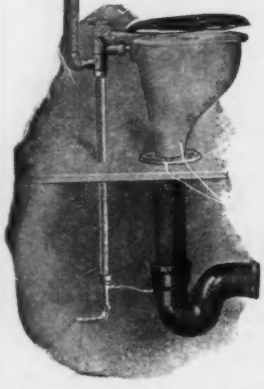
FROST PROOF CLOSETS

They require no pit.

They save water.

All bowls have enameled rims. In service daily, winter and summer.

No. 1



OVER 350,000 *Giving* *Satisfaction in All Climates*

The ideal water closets for Factories and Mill Villages, where thousands have been installed.

The most durable water closets made — excepting none.

Every Fixture Tested Under Hydraulic Pressure Before Leaving Factory.

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Ask your jobber

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Factory and Office at

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VOGEL PATENTED

No. 5 FACTORY CLOSET

This fixture fills the demand for a strong and durable automatic water saving closet outfit for factory use. The valve device is extremely simple and repairs, though seldom necessary, can be made by removing the valve cap back of bowl.

Zemco-lite

TRADE MARK

"The Cement Paint"

Test these Facts!

Mr. Mill Man,—we don't blame you for being skeptical about the paint you buy for your mill. But, if you would make a test of all the paints on the market, including ZEMCO-LITE and let the test sell the paint, we believe you would select ZEMCO-LITE.

A few facts about ZEMCO-LITE, "The Cement Paint":

1. ZEMCO-LITE improves with age.
2. Water has a tendency to make ZEMCOLITE more durable.
3. ZEMCO-LITE is made with pure WHITE Portland Cement.
4. Sets in a smooth WHITE coating—will not peel or blister.
5. Defies steam, moisture, weather or mill conditions.

Prove these facts to your own satisfaction. Try ZEMCO-LITE. You will find it is the ideal mill white. Southern mills are rapidly solving their paint problems with ZEMCO-LITE.

Also made in various colors for exterior mill cottage painting. Gives excellent results on stone, iron, stucco, concrete—anywhere a high grade economical paint is desired. Remember ZEMCO-LITE is not a high-priced product, but a high-grade long lasting paint that will satisfy and economize.

Drop us a postal and get the full details.

American Cement Paint Co.

Chattanooga, Tenn.

"Cotton Mill Machinery Calculations"

EVERY Textile Man should have these reference books. They cover in a detailed and thorough manner all calculations necessary to be made on any cotton mill machinery manufactured in the United States and constitute one of the best references on the subject obtainable.

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OVER THE SOUTH
there are over two-and-a-half-million happy spindles that are driven or lighted by H. & G. Trouble-Proof Electrical Installations. Every one of these installations presented problems that required careful planning and ability to forecast the contingencies of service.
The experience gained in solving the many electrical problems of Southern mills is assurance to you that no matter what your problem is, whether it be the installation of a motor or a few lights or the installation of an entire electrical installation for mill and mill village, the problem can be solved more economically for you, not only initially but permanently, by H. & G. Service.
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IT IS made from Rhoads famous Tannate tannage. Because of its wonderful grip it can be run at less tension than oak belt, thus saving wear on your bearings and making the drive easier on the belt itself.

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Cause uneven work. Slipping evener cone belts cause uneven laps. Friction in the apron and evener rolls makes the cone belt slip.

Ball bearings remove this friction and allow the cone belt to give the proper feed of cotton to the beater.

The installation is not expensive and is used on hundreds of lappers.

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Remember you have to buy only one Detroit Belt Lacing Machine in a lifetime. If anything goes wrong it will be replaced free of charge.

Detroit Belt Lacer Co., Detroit, Mich.

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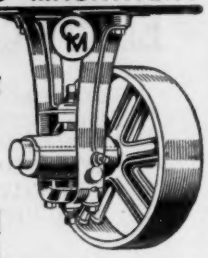

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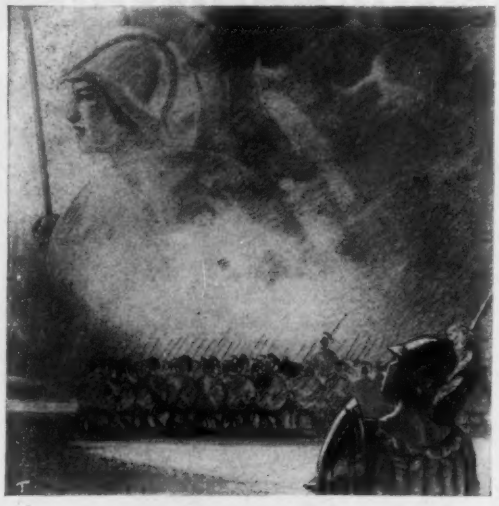

THE Spartans went forth to war singing; in fact history records them as the first singing army and it is said of them that in all their wars, no matter what adverse conditions they met, they did not quit.

The Spartan Belt will be found on the job, singing its song of power on thousands of different drives, proving its worth by never being ready to quit.

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Leather Belt Cement

It Sticks!
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WE USE IT ON

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Send $1.25 with the Coupon for a 1-pound Trial Can.

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THE JOHNSON FRICTION CLUTCH

AS USED ON THE

Morrison Straight Automatic Tentering Machine

EQUIP YOUR TEXTILE MACHINERY WITH THE JOHNSON FRICTION CLUTCH

Single Clutch Exterior

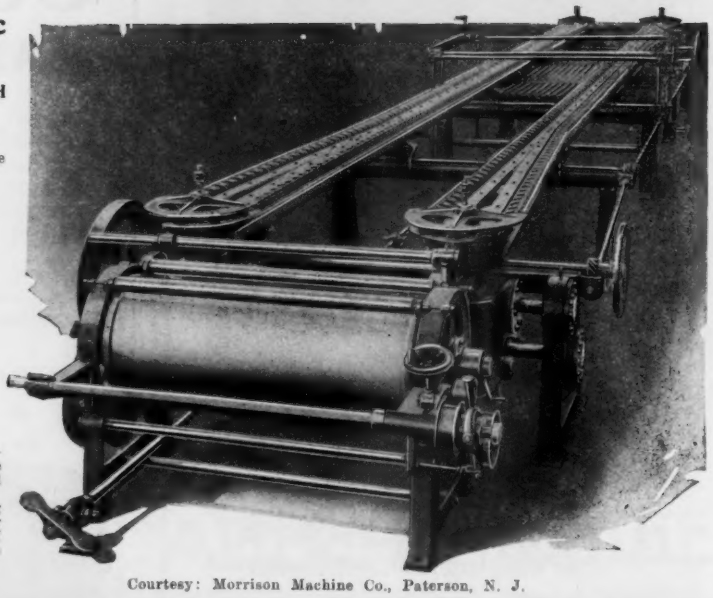
A No. 10 Single Clutch is used on the main drive shaft of each machine.

Single Clutch with pulley.

For textile machinery it is very essential that a reliable and powerful clutch be used so that the machine will always be working at its maximum capacity and thereby be efficient in output.

The Johnson Clutch has been tried by the leading machine manufacturers and adopted on its merit for many machines. The most of these machines are of special design for a particular purpose and therefore cannot be given publicity.

Let us work out your problem.
Write for Catalog G.



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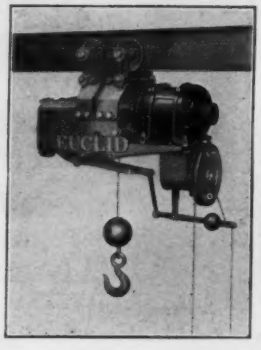
Reduce Handling Costs!

THE QUICKEST AND EASIEST WAY



is with a hoist—the work of ten men can be done in less time. And the most efficient hoist is an electric hoist—and the most efficient and dependable electric hoist is a EUCLID.

Let us send you interesting catalogs telling the advantages of electric hoists and showing the sizes and types for every mill use, large or small.

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ELECTRIC EUCLID HOISTS

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Stop that excessive Waste of Power

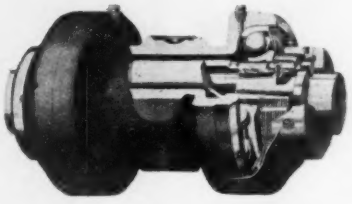
Chapman

"You Pay for them Whether You Buy them or Not"

Reduce Oiling and Maintenance Costs

Chapman Ball Bearings are effecting savings in power costs from 15% to 35% over the old power wasting method of using babbitted and solid bearings.

They permit speeding up of shafting and machines—thereby increasing production or making available more power for new machinery.



Chapman Ball Bearings require no attention except greasing once or twice each year. They are absolutely dust proof and drip proof. Compare with the old expensive way of daily oiling—spoilage of goods from dripping oil—replacement of worn bearings—noise—and all other unnecessary bearing troubles.

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To whom? Where?

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ELIMINATORS OF BEARING TROUBLES

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Patent Steel Belt Lacing

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Saves time—saves money—always ready.

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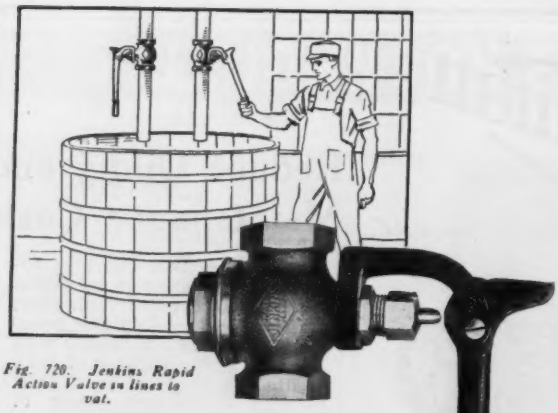
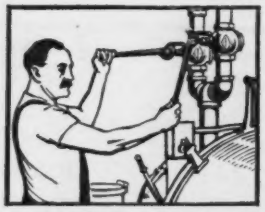


Fig. 720. Jenkins Rapid Action Valve in lines to vat.

A Rapid Action Valve for the textile industry.

This valve opens or closes immediately with a pull of the lever. Lever stays in either position without being held, and valve closes without line hammer.

Valve has bronze body and malleable iron lever. It is fitted with a Jenkins Renewable Disc for tight-closing.



Jenkins Rapid Action Valve in water and steam lines to textile wash wheel

The rapid on-and-off action of this valve saves valuable time and prevents a great deal of waste in lines where a quick flow of liquid, air, or steam is desired, or where a valve is worked very often. In the textile industry it is invaluable in lines to boiling and dyeing vats, shrinking machines, wash wheels, etc.

Send for our folder which completely describes this valve.

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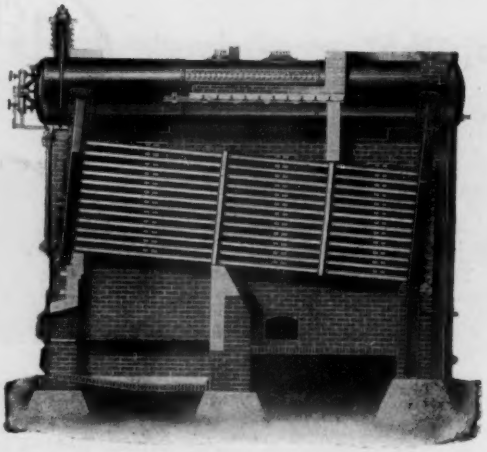

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VERTICAL WATER TUBE BOILERS
TUBULAR AND MARINE BOILERS
STEEL CASINGS, SMOKE STACKS

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CHATTANOOGA, TENN.
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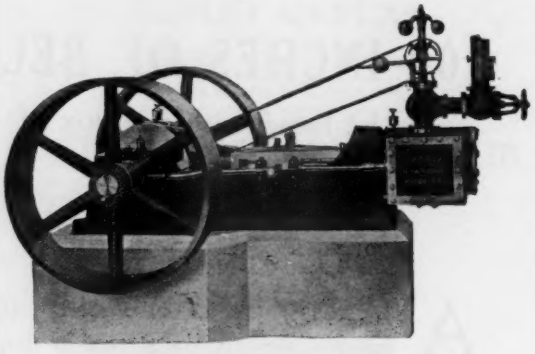

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High Pressure Return Tubular Boilers, High Grade Stationary Steam Engines, Tanks, Stacks, Stand Pipes.
Heavy Castings and Wrought Iron Works.

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HIGH SPEED

—make light work of heavy jobs!

When the huge propeller shaft of the U. S. S. America had to come out for repairs, Cyclone Hoists bore the brunt of the lifting.

The mechanics, mere pygmies in relative comparison to the giant task before them, aided by Cyclone Hand Chain Hoists handled the ponderous shaft as easily and deftly as though it weighed pounds instead of tons.

Whenever and wherever the men in your plant are up against a lifting job, team them up with a Cyclone Hoist.

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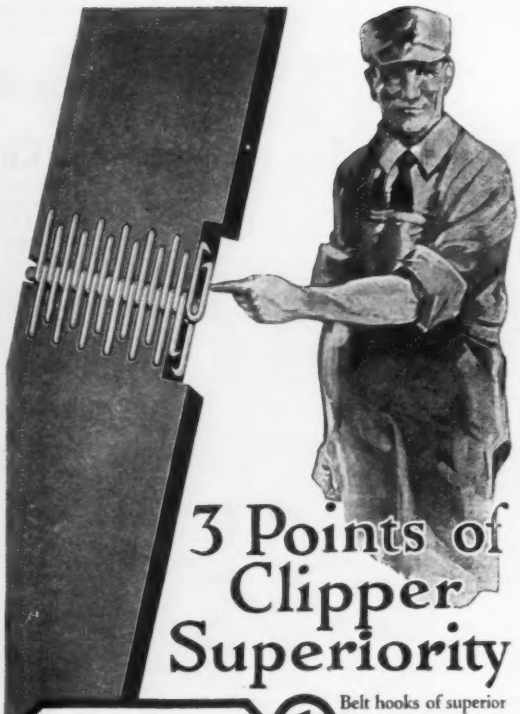
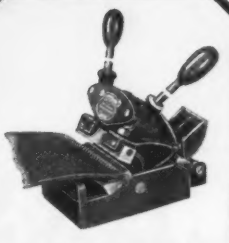


3 Points of Clipper Superiority



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Anyone can lace a belt with the
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☐ Please send Clipper Belt Lacer on 30 days trial.
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Condensation in your slashers, dryers, presses or heating system wastes just as much fuel. It retards steam circulation, cools the steam and prevents heat transfusion.

A Morehead Back-to-Boiler System will correct this condition. It will keep your steam lines clear and dry, thus enabling every pound of steam to do its maximum work. It will drain condensation as it forms and return it to the boilers —without pumps—at temperatures as high as 360 degrees.

Production will rise, costs will drop, and the increased efficiency of your entire steam system will pay for the cost of the equipment many times over. Write for details of what we have done for others.

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"BACK-TO-BOILER-SYSTEM"
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS. DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

BOILERS

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OUR SPECIALTY

WALSH & WEIDNER BOILERS with our improved Steel Casing make the ideal Steam Plant. The cost of installation is moderate, the plant looks neat, cost of repairs is slight and they will save from 10 to 25% of your fuel bill.

We also manufacture Tanks of all description, Towers and Tanks, Steel Stacks, Steel Breeching, Smokestacks, Structural Steel and Plate Steel Work.

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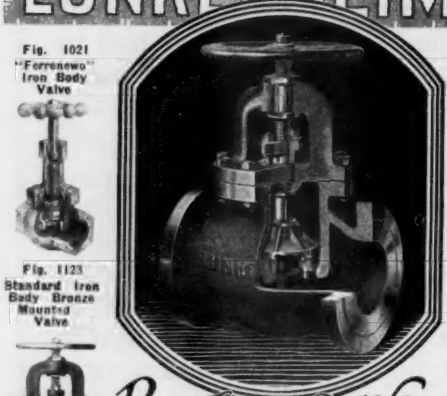

Fig. 1021 "Ferrenewo" Iron Body Valve

Fig. 73 "Renewo" Bronze Valve

Fig. 1123 Standard Iron Body Bronze Mounted Valve

Fig. 884 Extra Heavy Iron Body Bronze Mounted Valve

Bronze Iron and Steel Valves

Fig. 608—Steel Monel Mounted Valve

Designed for service and economy of maintenance, with generous proportions, materials of the highest grade, skilled workmanship, regrindable seating surfaces, renewable parts, including the seat and disc,—all tend toward durability and permanence of the Valves in the line.

Lunkenheimer Globe and Angle Valves are furnished in Bronze, Iron Body Bronze Mounted, and Steel Monel Mounted.

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America's Best since 1862

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It is one accomplishment to secure delivery of fuel and an equally important accomplishment to handle it efficiently and economically after it arrives. The inevitable delays, frequent demurrage charges, excessive labor costs and the general "lost motion" consequent to hand shoveling, have become matters of vital consideration to prominent executives.

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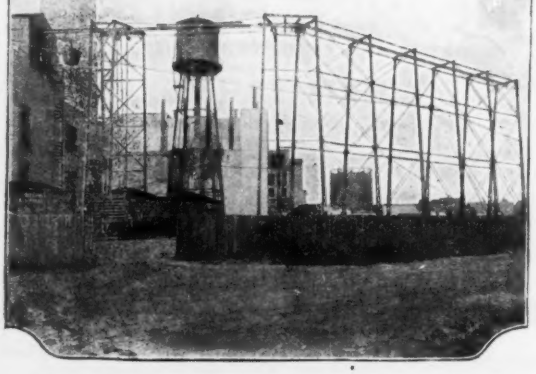
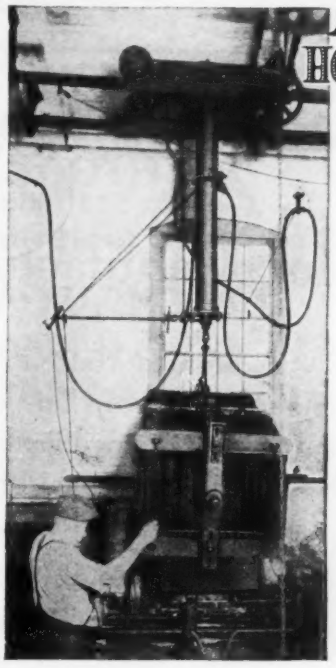


CURTIS AIR HOISTS



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Used in The Textile Industry

Curtis one man All Steel Air Hoists and Curtis Roller Bearing Trolleys are effecting important economies in leading textile mills throughout the country.

Why not install a Curtis Air Hoist and operate it with the air you now have available? The wide variety of uses to which Curtis equipment can be most economically applied is worthy of your immediate investigation.

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THE SHORT LINE BETWEEN NEW ENGLAND

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Maintaining a Twenty-Four Hour Schedule Between

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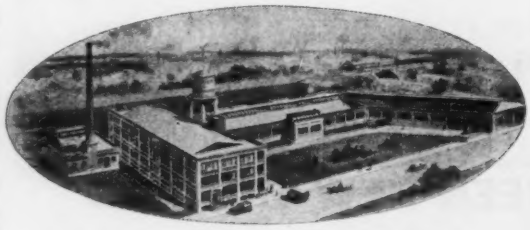
"The Southern Serves the South"



View of our Mercerizing and Bleaching Plant

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Established 1908

Spinners, Bleachers, Dyers and Mercerizers of High Grade Combed Yarns

By using our Spinning and Mercerizing you are always assured of a standard product.

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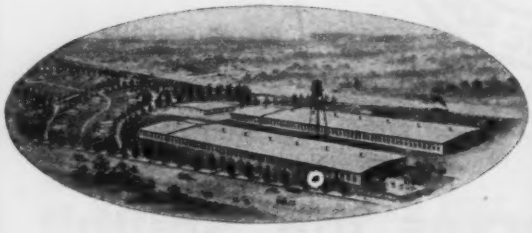

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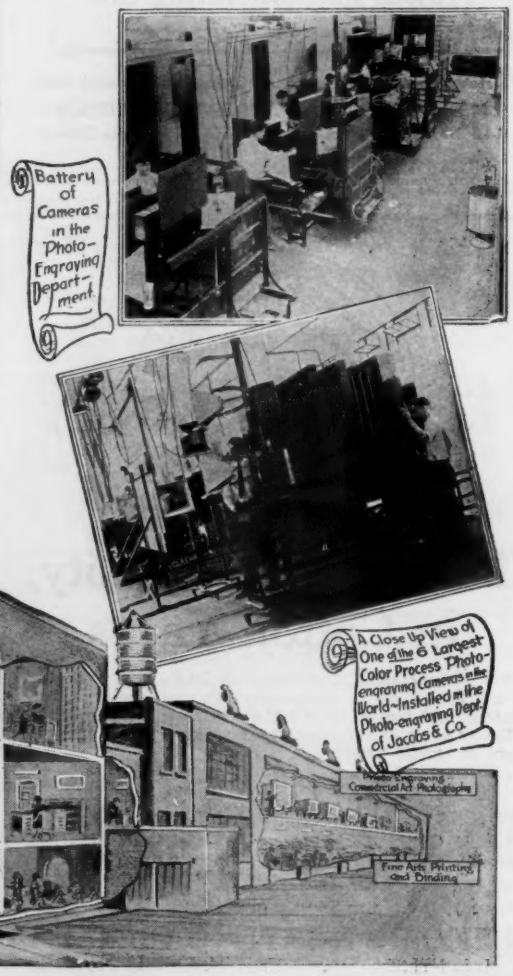
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Advertising, Commercial Art
Photo-Engraving—Electrotyping
Nickeltyping
Color Printing

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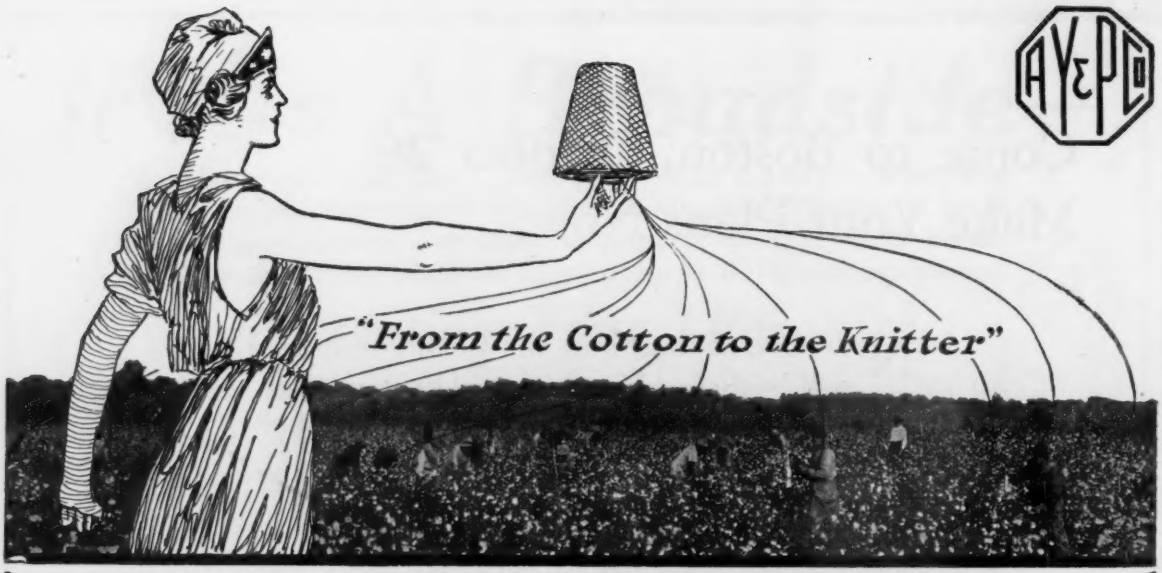

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Specifications

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Oval Cans

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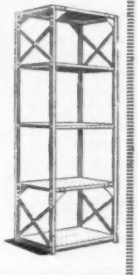

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PARK A. DALLIS

ARCHITECT AND ENGINEER

1604 CANDLER BLDG. ATLANTA, GEORGIA

BUYERS' INDEX—Continued.

CARD AND NAPPER CLOTHING.
Davis & Furber Mch. Co.
Howard Bros. Mfg. Co.

CARD FEEDS.
Davis & Furber Mch. Co.
Proctor & Schwartz, Inc.
Schofield Co., Wm.
Whitin Machine Co.

CARD GRINDING MACHINERY.
Proctor & Schwartz, Inc.
Roy & Son, B. S.
Whitin Machine Works.

CARPET MACHINERY.
Butterworth, H. W., & Sons Co.
Crompton & Knowles Loom Works.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Schofield, Wm., Co.
Textile Finishing Mchry Co.

CARRIER APRONS.
(See Aprons.)

CARRIER SYSTEM.
Euclid Crane & Hoist Co.
Curtis Pneumatic Machry. Co.
Wagner Mfg. Co.

CASES—WOODEN.
(See Packing Cases.)

CASTINGS.
Briggs, Schaffner Co.
Cole Mfg. Co., R. D.
Cresson-Morris Co.
Lombard Fdry. & Mch. Co.
Walsh & Weidner Boiler Co.

CAUSTIC SODA.
(See Bleaching Materials.)

CEMENT REINFORCEMENT.
Birmingham Slag Co.
Truscon Steel Co.

CEMENT AND BRICK COATING.
American Cement Paint Co.
Detroit Graphite Co.
Dixon Crucible Co., Jos.
St. Louis Surfacer & Paint Co.
Hockaday Co.
Sonneborn Sons, Inc., L.
Wadsworth, Howland & Co. Inc.
Ware Paint Co.

CENTRAL STATION (ELECTRIC).
Alabama Power Co.
Georgia Railway & Power Co.
Tennessee Electric Power Co.

CENTRIFUGALS.
Cresson-Morris Co.
Fletcher Works.
Goulds Mfg. Co.
Schaum & Uhlinger.
Tolhurst Mch. Wks.

CHAIN DRIVES.
(See Belting—Chain Link.)

CHAIN—BLOCK, BICYCLE, AUTO. ENGINE, AGRICULTURAL, ETC.
Fulton Supply Co.
Link Belt Co.
Morse Chain Co.
Renold, Inc., Hans.

CHAIRS AND STOOLS.
(See Furniture—Mill.)

CHECK STRAPS.
Bond Co., Chas.
Fulton Supply Co.
Hayes Loom Reed & Harness Co.
Jacobs Mfg. Co., E. H.

CHEMICALS.
(See Dyestuffs and Chemicals.)

CHLORINE GAS.
Electro Bleaching Gas Co.
Mathieson Alkali Works, Inc.

CLEANING AND AERATING MACHINE FOR COTTON.
Murray Company, The.

CLOCKS—HANK, ETC.
(See Counters.)

CLOCKS (TIME).
Root Co.

CLOCKS—WATCHMAN.
Foxboro Co., Inc.
Root Co.

CLOSETS—WATER.
(See Toilets.)

CLOTH CUTTERS.
Firsching, J. A.
Foster Machine Co.
Wildman Mfg. Co.

CLOTH EXPANDER (REGULATING).
Leyland & Co., Inc., Thos.

CLOTH GUIDERS.
Leyland & Co., Inc., Thos.

CLOTH ROOM MACHINERY.
Butterworth, H. W., & Sons Co.
Davis & Furber Mch. Co.
Firsching, J. A.
Foster Machine Co.
Hopedale Mfg. Co.
Leyland & Co., Inc., Thos.
Saco-Lowell Shops.
Textile Finishing Mchry. Co.
Williams Co., J. H.
Wildman Mfg. Co.

CLOTH SHRINKING MACHINERY.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Tolhurst Mch. Wks.

CLOTH TESTERS.
Scott Co., Henry L.

CLOTH WINDERS.
(See Winders.)

CLUTCHES—FRICTION.
Allis-Chalmers Mfg. Co.
Carlyle-Johnson Machine Co.
Cresson-Morris Co.
Fulton Supply Co.
Link-Belt Company.

CLUTCH LININGS.
Carlyle-Johnson Mch. Co.

COAL AND ASH HANDLING MACHINERY.
Godfrey Conveyor Co.
Link-Belt Company.

COAL TAR DISINFECTANTS.
(See Disinfectants.)

COCKS.
(See Valves.)

COLOR PAILS.
(See Buckets—Mill.)

COMB APRONS.
(See Aprons.)

COMBERS AND COMBER SUPPLIES.
Foster Machine Co.
U S Bobbin & Shuttle Co.
Whitin Machine Wks.

COMMISSION MERCHANTS & DEALERS.
(See Cotton Cloth Commission Merchants.)

COMPRESSORS—AIR, GAS, ETC.
Allis-Chalmers Mfg. Co.
Curtis Pneumatic Mchry Co.
Fulton Supply Co.
General Electric Co.
Goulds Mfg. Co.

COMMUTATOR BRUSHES.
(See Brushes—Motor and Generator.)

CONCRETE REINFORCEMENT.
Birmingham Slag Co.

CONCRETE REINFORCING STEEL.
Ryerson & Son, Inc., Jos. T.

CONDENSERS.
Allis-Chalmers Mfg. Co.

CONDUITS.
(See Elec. Machinery & Supplies.)

CONE BELT TENSION DEVICE.
Rahan Textile Mch. Co.

CONES (KNITTING YARN).
Foster Mch. Co.
Southern Novelty Co.

CONE WINDING MACHINE.
(See Winding Machinery.)

CONNECTORS—FRANKEL SOLDERLESS.
Westinghouse Elec. & Mfg. Co.

CONSULTANTS (BUSINESS METHODS).
Ernst & Ernst.

CONSULTING ENGINEERS.
(See Architects and Engineers)

CONTRACTORS AND ENGINEERS—BUILDING.
Dowman, George.
Dowman-Dozier Mfg. Co.
Sirrine & Co., J. E.
Truscon Steel Co.

CONTRACTORS—ELECTRICAL.
(See Electrical Engineers.)

CONTRACTORS (HEATING & PLUMBING).
Walker Electric & Plb. Co.

CONTRACTORS (PAINTING).
Williams, C. L.

CONTRACTORS (ROOFING).
Dowman, Geo.
Dowman Dozier Mfg. Co.
Murphy's Sons, C. P.

CONTRACTORS (PAVING).
McCrary Co., J. B.

CONTRACTORS (WATERWORKS).
McCrary Co., J. B.

CONTRACTORS (SEWAGE).
McCrary Co., J. B.

CONTROLLING INSTRUMENTS—TEMPERATURE.
Bristol Co.
Foxboro Co., Inc.
General Electric Co.
Taylor Instrument Co.

CONVEYORS—BELT.
(See Belt Conveyors.)

CONVEYING MACHINERY.
American Supply Co.
Chisholm-Moore Mfg. Co.
Cresson-Morris Co.
Curtis Pneumatic Mchry. Co.
Dowman, George.
Euclid Crane & Hoist Co.
Fulton Supply Co.
Godfrey Conveyor Co.
Link-Belt Co.
Morse Chain Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Renold, Hans
Saco-Lowell Shops.
Schofield, Wm. Co.
Wagner Mfg. Co.

CONVEYORS—PORTABLE.
Euclid Crane & Hoist Co.
Link-Belt Co.

COOLERS.
(See Humidifying Apparatus.)

COOLERS—WATER.
(See Water Coolers.)

COOLING AND CONDITIONING EQUIPMENT.
American Blower Co.
Buckeye Blower Co.
Sturtevant Co., B. F.

COOLING TOWERS.
(See Tanks and Towers.)

COPPER STAMPS AND STENCILS.
(See Stamps, Stencils, etc.)

CORDAGE MACHINERY.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The

CORPORATION FINANCE (TEXTILE).
American Trust Co.

CORRUGATED SHEET STEEL.
Ryerson & Co., Inc., Jos. T.

COST SYSTEMS.
Ernst & Ernst.

COTTAGES (READY BUILT).
Minter Homes Co.

COTTON CLEANING AND AERATING MACHINE.
Murray Company, The.

COTTON FANS.
(See Blowers.)

COTTON YARN AND CLOTH COMMISSION MERCHANTS AND DEALERS.
Aberfoyle Mfg. Co.
Boger & Crawford.
Callaway Mills.
Carver-Beaver Yarn Co., Inc.
Fawcett, Hughes
Florsheim, H. A.
Hunter Mfg. & Comm. Co.
Jamieson, J. B.
Lane & Co., J. H.
Tolar & Hart.
Weimar Bros.
Woodward, Baldwin & Co.

COTTON MERCHANTS AND BROKERS
Beer & Co., H. & B.

COTTON MILL MACHINERY AND SUPPLIES.
American Blower Co.
Atlanta Harness & Reed Mfg. Co.
Auto Creel Corp.
Rahan Textile Mch. Co.
Barber-Colman Co.
Butterworth & Sons, H. W.
Crompton & Knowles Loom Works.
Davis & Furber Mch. Co.
Draper Corporation.
Dowman, George.
Dryer Corp. of America.
Eclipse Textile Devices, Inc.
Firsching Co., J. A.
Fletcher Works.
Foster Machine Co.
Foxboro Co., Inc.
Fulton Supply Co.
Greist Mfg. Co.
Hayes Loom Reed & Harness Co.
Hopedale Mfg. Co.
Howard Bros. Mfg. Co.
Hunt Machine Co., Rodney.
Hyatt Roller Bearing Co.
Jacobs Mfg. Co., E. H.
Lestershire Spool Mfg. Co.
Lowell Crayon Co.
Leyland & Co., Thos.
Mill Devices Co.
Mossberg Pressed Steel Corp.
Parker Co., Walter L.
Phila. Drying Mchry. Co.
Proctor & Schwartz, Inc.
Reuthinger, J. J.
Root Co.
Roy & Son, B. S.
Sargent's Sons Corp., C. G.
Saco-Lowell Shops.
Schaum & Uhlinger.
Schofield Co., Wm.
Shambow Shuttle Co.
Stafford Co.
Steel Heddle Mfg. Co.
Sturtevant Co., B. F.
Suter, Alfred.
Terrell Machine Co.
Textile Finishing Machinery Co.
Textile Rubber Co.
Toledo Scale Co.
Tolhurst Mch. Wks.
Universal Winding Co.
U S Bobbin & Shuttle Co.
Vermont Spool & Bobbin Co.
Warp Compressing Mch. Co.
Washburn & Sons, L. B.
Williams Co., J. H.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

COTTON TAPE LOOM.
Fletcher Works.
Foster Mch. Co.
Schaum & Uhlinger.

COTTON YARN MILLS.
(See Yarn Manufacturers.)

COUNTERS—REVOLUTION, HANK, PICK, ETC.
Bristol Co.
Foxboro Co.
Root Co.

COUNTERS—RESTAURANT.
(See Restaurant Equipment.)

COUPLING—SHAFT.
Cresson-Morris Co.
Dodge Mfg. Co.

COVERING—ROLLER.
Bond Co., Chas.

CRANES.
(See Hoists.)

CRAYONS.
Eclipse Crayon Co.
Lowell Crayon Co.

CREELS.
Auto Creel Corp.
Suter, Alfred.
Warp Compressing Mch. Co.

CREOSOTED FLOORING, BLOCKS, POSTS, SHINGLES, ETC.
Southern Wood Preserving Co.

CUTS FOR PRINTING.
Jacobs & Co.

CUTTERS—CLOTH.
(See Cloth Cutters.)

CUTTERS—THREAD.
(See Thread Cutters.)

DECARBONIZING APPARATUS
Oxweld Acetylene Co.

CUTTING APPARATUS (OXY-ACETYLENE & OXY HYDROGEN).
Oxweld Acetylene Co.
Standard Gas Products Co.

DEHUMIDIFIERS.
American Moistening Co.
Sturtevant Co., B. F.

DELIVERY CASES.
(See Boxes—Packing.)

DESKS—FACTORY.
Allen Co.
Lupton's Sons Co., David.

DEXTRINES.
(See Dyestuffs and Chemicals.)

DIAL SCALES.
(See Scales.)

DIES—STEEL.
(See Stamps, Stencils, Etc.)

DIE STOCKS.
(See Pipe Threaders.)

DISINFECTANTS.
Barrett Co., The.

DOBBY CHAINS.
Crompton & Knowles Loom Wks.
Whitin Machine Works.

DOBBY CARDS.
Jacobs & Co., E. H.

DOFFING BOXES—MILL.
(See Boxes—Mill.)

DOFFER FILLETS.
(See Fillets.)

DOFFING CANS.
(See Cans.)

DOORS—STEEL.
Dowman, George.
Dowman-Dozier Mfg. Co.
Mills Co.
Lupton's Sons Co., David.
Variety Fire Door Co.

DRAWINGS AND ARTWORK.
Jacobs & Co.

DRAWING FRAMES.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

DRESSING ROOMS (METAL PARTITION).
Mills Co.

DRILLS—ELECTRIC.
(See Electric Machinery.)

DRINKING FOUNTAINS.
(See Fountains—Drinking.)

DROP WIRES.
Draper Corp.
Greist Mfg. Co.
Mossberg Pressed Steel Corp.
Steel Heddle Mfg. Co.
Williams Co., J. H.

DRYING APPARATUS.
American Blower Co.
Buckeye Blower Co.
Dryer Corp. of America.
Philadelphia Drying Mchry Co.
Proctor & Schwartz, Inc.
Sturtevant Co., B. F.

DRYING FORMS—HOSIERY.
Pearson, Jos. T.

DRYING MACHINERY AND EQUIPMENT.
American Blower Co.
American Laundry Mchry. Co.
Butterworth, H. W., & Sons Co.
Dryer Corp. of America.
Philadelphia Drying Mchry. Co.
Proctor & Schwartz, Inc.
Sargent's Sons Corp., C. G.
Sturtevant Co., B. F.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.

DUST COLLECTORS.
(See Blowers and Blowing Systems.)

DUSTING MACHINERY.
Davis & Furber Mch. Co.
Proctor & Schwartz, Inc.
Schofield Co., Wm.

DYERS, BLEACHERS AND FINISHERS.
American Yarn & Processing Co.
Boger & Crawford.
Dixie Mercerizing Co.
Franklin Process Co.
Sayles Finishing Plants, Inc.
United Piece Dye Wks.

DYEING, BLEACHING, FINISHING AND PRINTING MACHINERY AND EQUIPMENT.
American Laundry Mchry. Co.
Butterworth & Sons Co., H. W.
Cole Mfg. Co., R. D.
Dryer Corp. of America.
Electro Bleaching Gas Co.
Firsching, J. A.
Fletcher Works.
Franklin Process Co.
Hightower Box & Tank Co.
Hunt Machine Co., Rodney.
Klauder-Weldon Dyeing Mch. Co.
Macomb Machine Co.
Phila. Drying Machinery Co.
Proctor & Schwartz, Inc.
Reliance Machine Works.
Schaum & Uhlinger.
Textile Finishing Machinery Co., The.
Tolhurst Machine Works.
Woolford Wood Tank Co., G.

DYEING MACHINES (PACKAGE AND SPOOL).
Franklin Process Co.

DYE BAGS OR NETS.
Smith Mfg. Co.

DYE STICKS.
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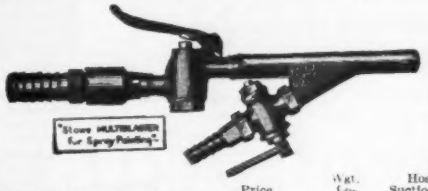

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DYESTUFFS AND CHEMICALS.
Arnold, Hoffman & Co.
Barrett Co.
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Ford Co., J. B.
Grasselli Chemical Co.
India Alkali Works.
Kali Mfg. Co.
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Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Quaker City Chemical Co.
Roessler & Hasslacher Chemical Co.
New Brunswick Chemical Co.
Pennick & Ford, Ltd.
Rohm & Haas Co.
Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
Surpass Chemical Co.
United Chemical Products Corp.
Wolf & Co., Jacques.

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ELECTRIC LAMP GUARDS.
Ivanhoe Regent Works.
Perry-Mann Electric Co.
Southern Elec. Supply Co.

ELECTRICAL ENGINEERS AND CONTRACTORS.
Curtis Co., The
Huntington & Guerry, Inc.
McCrary Co., J. B.
Panton, Harrison D.
Perry-Mann Electric Co
Standard Electric Co.
Walker Elec. & Plbg. Co.

ELECTRIC LIGHTING ENGINEERS.
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Allis-Chalmers Mfg. Co.
American Blower Co.
Bristol Co.
Carter Electric Co.
Cooper Hewitt Electric Co.
Curtis Co., The
Cutler Works, George.
Euclid Crane & Hoist Co.
Fulton Supply Co.
General Electric Co.
Ivanhoe-Regent Works.
Perry-Mann Electric Co.
Seawell, Luke.
Southern Elec. Supply Co.
Standard Electric Co.
Sturtevant Co., B. F.
Walker Electric & Plbg. Co.
Walsh & Weidner Boiler Co.
Westinghouse Elec. & Mfg. Co.

ELECTRIC POWER.
(See Power.)

ELECTRIC PRESSES (HIGH-PRESSURE).
Res Eng'g Corp.

ELECTRIC TRACTORS AND TRUCKS.
(See Tractors and Trucks—Electric.)

ELECTROTYPES.
Jacobs & Co.

ELEVATORS—PORTABLE.
Collins J. D.
Euclid Crane & Hoist Co.

ELEVATORS.
Link-Belt Company.

ENAMELED IRON AND GLASS FOR TEXTILE MACHRY.
Mitchell Bissell Co.

ENAMEL—MILL WHITE.
(See Paint.)

ENGINEERS—MILL.
(See Architects.)

ENGINES—OIL, GAS AND GASOLINE.
Allis-Chalmers Mfg. Co.
Fulton Supply Co.

ENGINES (STEAM).
Allis-Chalmers Mfg. Co.
American Blower Co.
Cole Mfg. Co., R. D.
Fulton Supply Co.
Lombard Iron Works & Supply Co.
Schofield's Sons Co., J. S.
Toomey, Frank.

ENGINE ROOM APPLIANCES AND SUPPLIES.
American Blower Co.
Casey-Hedges Co.
Crane Co.
Fulton Supply Co.
Jenkins Bros.
Lunkenheimer Co.
Westinghouse Elec. & Mfg. Co.

ENGINEERS (CONSULTANT AND EFFICIENCY).
Ernst & Ernst

ENGINEERS, CONTRACTORS & BUILDERS (SANITARY & PAVING).
McCrary Co., J. B.

ENGINEERS (TEXTILE AND MECHANICAL CONSULTING).
Panton, Harrison D.

ENGINEERS (MECHANICAL).
Bird-Potts & Co., Inc.

ENGRAVING AND CUTS.
Jacobs & Co.

ETCHING—(PRINTING).
Jacobs & Co.

EXHAUSTERS.
(See Blowers.)

EXPORTERS—COTTON.
(See Brokers.)

EXTRACTORS—HYDRO.
American Laundry Mchry. Co.
Fletcher Works.
Schaum & Uhlinger.
Tolhurst Machine Works.

FACTORY DESKS.
Lupton's Sons Co., David.

FACTORY AND INDUSTRIAL SITES.
(See Industrial Sites.)

FACTORY MANAGEMENT SYSTEMS.
Ernst & Ernst.

FANS—ELECTRIC.
American Blower Co.
Buckeye Blower Co.
Carter Electric Co.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co.

FANS—CONVEYING, POWER AND EXHAUST.
(See Blowers and Blowing Systems.)

FASTENERS—BELT.
(See Belt Fasteners.)

FEED WATER PURIFIERS.
(See Boiler Feed Water Purification.)

FEEDERS.
(See Automatic Feeders.)

FELTING MACHINERY.
Proctor & Schwartz, Inc.

FENCE—STEEL AND IRON.
Anchor Post Iron Works.
Cyclone Fence Co.
Dorman, George

FENCE POSTS—CREOSOTED PINE.
Southern Wood Preserving Co.

FIBRE PRODUCTS.
Standard Fibre Co.

FILLETS (CYLINDER, DOFFER, BURNISHER AND STRIPPER).
Howard Bros. Mfg. Co.

FILLING—CAP AND WARP.
U S Bobbin & Shuttle Co.

FILTERS—WATER.
American Water Softener Co.
Scaife & Sons Co., Wm. B.

FILTERS (ALUM).
Lennig & Co. Chas.

FILTER CLOTHS
Smith Mfg. Co.

FINISHING.
(See Dyers, Bleachers and Finishers.)

FINISHING, BLEACHING AND SIZING MATERIALS.
Arnold Hoffman & Co.
Barrett Co.
Borne Scrymser Co.
Bosson & Lane.
Ciba Co., Inc.
Corn Products Refining Co.
Electro Bleaching Gas Co.
Ford Co., J. B.
India Alkali Works.
Kali Mfg. Co.
Keever Starch Co.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Metz & Co., H. A.
National Aniline & Chemical Co.
Roessler & Hasslacher Co.
New Brunswick Chemical Co.
Pennick & Ford, Ltd.
Quaker City Chemical Co.
Rohm & Haas Co.
Sandoz Chemical Co.
Sonneborn Sons, Inc., L.
Staley Mfg. Co., A. E.
Stein, Hall & Co.
United Chemical Products Corp.
Warren Soap Mfg. Co.
Wolf & Co., Jacques.

FIRE DOORS AND HARDWARE.
Bogert & Carlough.
Bowman-Deuter Mfg. Co.
Bowman, George.
Lupton Sons Co., David.
Sanymetal Products Co.
Truscon Steel Co.
Variety Fire Door Co.

FIRE HOSE.
(See Hose—Fire.)

FIRE PROTECTING PAINT.
(See Paint.)

FLAT STEEL HEDDLES.
Steel Heddle Mfg. Co.

FLAX SPINNING.
U S Bobbin & Shuttle Co.

FLEXIBLE COUPLINGS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.

FLOOD LIGHTS—ELECTRIC.
Cooper Hewitt Electric Co.
Ivanhoe Regent Works.
General Electric Co.
Perry-Mann Electric Co.
Southern Electric Supply Co.
Westinghouse Elec. & Mfg. Co

FLOORS (TAR CONCRETE).
Murphy's Sons, C. P.

FLOORING LUMBER.
Southern Cypress Mfg. Asso.
Southern Wood Preserving Co.

FLOORING—WOOD BLOCKS.
Southern Wood Preserving Co.

FLOOR SCRUBBING MACHINE
American Scrubbing Equipment Co.

FLOOR SCRUBBING POWDERS.
(See Scrubbing Powders.)

FLOOR SWEEPS.
(See Brushes.)

FLUTED ROLLS.
Howard & Bullough.
Proctor & Schwartz, Inc.
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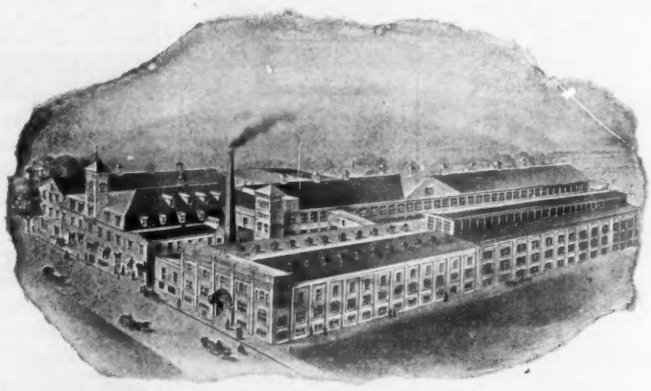

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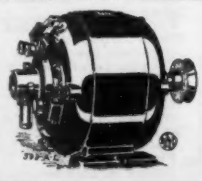
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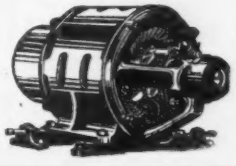

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Hunt Machine Co., Rodney.
Mossberg Pressed Steel Co.
Saco-Lowell Shops.
Schaum Co., Wm.
Whitin Machine Works.

REFLECTORS—LAMP.
(See Lamp Reflectors.)

REGULATORS—LIQUID LEVEL.
Fulton Co., Inc.
General Electric Co.

REGULATORS (COMPRESSED GAS).
Oxweld Acetylene Co.

REGULATORS—PRESSURE.
Bristol Co.
Foxboro Co., Inc., The.
General Electric Co.
Taylor Instrument Co.

REGULATORS—TEMPERATURE.
(See Temperature Controllers.)

REINFORCING SLAG.
Birmingham Slag Co.

REPAIRING—ELECTRICAL.
Briggs Shafting Co.
Currie Co., The
Southern Electrical Supply Co
Huntington & Guerry, Inc.
Westinghouse Elec & Mfg. Co.

REPAIRING—TEXTILE MACHINERY, ETC.
Bird-Potts Co., Inc.
Briggs Shafting Co.
General Machine Works.
Southern Spindle & Flyer Co.
Standard Electric Co.

RESTAURANT EQUIPMENT.
Sanymetal Products Co.

RIBBERS.
(See Knitting Machinery.)

RIB TOP CUTTERS.
General Machine Works.
Whitman Mfg Co

RING TRAVELERS—STEEL AND BRONZE.
Whitinsville Spinning Ring Co
Whitin Machine Works.

RINGS—SPINNING.
(See Spinning Rings.)

ROCKER SHAFT BEARINGS.
(See Bearings.)

RODS (WELDING).
Oxweld Acetylene Co.

ROLLS—CALENDER.
Butterworth & Sons Co., H. W.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS—RUBBER COVERED.
Butterworth & Sons Co., H. W
Textile Finishing Mchy. Co.
Stowe & Woodward Co.

ROLLS—STEEL.
Butterworth & Sons Co., H. W.
Southern Spindle & Flyer Co.
Textile Finishing Mchy. Co.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLLS—WOODEN.
U S Bobbin & Shuttle Co.
Washburn, Inc.

ROLL BEARINGS.
Hyatt Roller Bearing Co.

ROLLER LEATHER.
Reed & Co., Chas.

ROOFING.
Barrett Co
Cortright Metal Roofing Co.
Dowman, George.
Dowman Dozier Mfg. Co.
Murchy's Sons, C. P.
Richardson Co
Southern Wood Preserving Co.
Wadsworth Howland & Co.

ROOFERS.
Dowman Geo
Dowman Dozier Mfg. Co.
Murchy's Sons, C. P.

ROOFS WATERPROOFED AND INSULATED.
Murchy's Sons, C. P.

ROOFING AUXILIARIES (PIPE GUTTERS—EAVE TROUGH—ETC.)
Dowman, George.
Dowman Dozier Mfg. Co.

ROOF AND CEMENT COATING.
American Cement Paint Co.
Barrett & Co.
Detroit Graphite Co.
Rockrite Co
Johnson & Co., Inc., Oliver.
Murchy's Sons, C. P.
Sanymetal Products Co.
Wadsworth, Howland & Co.
Ware Paint Co.

ROPE—TRANSMISSION.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Link-Belt Company.

ROVING CANS.
(See Cans—Roving.)

ROVING MACHINERY.
Howard & Bullough.
Saco-Lowell Shops
Whitin Machine Works.

RUBBER COVERED ROLLS.
Stowe & Woodward Co.

RUBBER SPECIALTIES (TEXTILE MILLS).
Textile Rubber Co
Stowe & Woodward Co.

RUBBER STAMPS.
(See Stamps, Stencils, Etc.)

SALTS.
(See Finishing & Sizing Materials.)

SAND BLAST DEVICE.
Stowe Jr., Geo. M.

SASH OPERATOR (WINDOW).
Callahan, Co., T. J
Dowman, George.

SANITARY PRODUCTS.
Crane Co
Davis Septic Tank & Eng. Co.
Manufacturing Equip. & Eng'g Co.
Rundle-Spence Mfg. Co.
Sanymetal Products Co.
Vogel Co., Jos. A
Walker Electric & Mfg. Co

SANITARY ENGINEERS, CONTRACTORS & BUILDERS.
(See Engineers—Sanitary).

SASH—WINDOW—STEEL.
(See Window Sash).

SAWING MACHINERY.
Racine Tool & M h. Co.

SAW BLADES FOR BAND SAWS.
Racine Tool & Mch. Co.

SAXOPHONES, ETC.
(See Musical Instruments.)

SCALES.
Toledo Scale Co

SCALE PREVENTER—BOILER.
(See Boiler Feed Water Purification.)

SCREENS—MOVING PICTURE.
Southern Theatre Equip. Co.

SCREENS AND SIEVES—PERFORATED.
Allis-Chalmers Mfg. Co.
Eadie Perforating Co.
Link Belt Company

SCOURING MACHINERY.
(See Washers—Cloth.)

SCRUBBING MACHINE—FLOOR.
American Scrubbing Equip. Co

SCRUBBING AND WASHING POWDERS.
Mathieson Alkali Works.
India Alkali Works.
Warren Soap Mfg. Co.

SCUTCHERS
Leyland & Co., Thos.
Whitin Machine Works.

SECOND HAND MACHINERY AND SUPPLIES.
Old Hickory Powder Plant.
Tuscon Const. Inc.

SECTION BEAMS.
(See Beams.)

SELVAGE HARNESS.
(See Harness.)

SEWING MACHINES.
Merrow Machine Co., The.
Textile Finishing Mchry Co.

SHADES—ELECTRIC LAMP.
(See Reflectors.)

SHAFTING AND HANGERS.
Allis-Chalmers Mfg. Co.
Cresson-Morris Co.
Dodge Mfg Co.
Fafnir Bearing Co.
Fulton Supply Co
Hyatt Roller Bearing Co.
Link-Belt Company.
Skayef Ball Bearing Co.
Transmission Ball Bearing Co.

SHEET STEEL (PLAIN AND GALVANIZED).
Pregeon & Son, Inc., Jos. T.

SHEWING—SECTIONAL STEEL.
Dowman, George.
Dowman Dozier Mfg Co.
Hyatt Roller Bearing Co.
Linton's Sons Co. David.
Manufacturing Equip & Eng'g Co.
Mills Co.
Sanymetal Products Co.

SHINGLES—ASPHALT.
Barrett Co
Dowman, George.
Dowman Dozier Mfg. Co.

SHINGLES—METAL.
Cortright Metal Roofing Co.
Dowman, George
Dowman Dozier Mfg. Co.

SHINGLES—WOOD
Southern Cypress Mfg Assn
Southern Wood Preserving Co

SHIPPING ROOM MACHINERY AND SUPPLIES
Atlanta Stamp & Stencil Wks.
Bradley Mfg Co A J.
Dixie Seal & Stamp Co
Hightower Box & Tank Co.
Lewis Co C B.
Smith Mfg. Co.
Standard Fiber Co.
Toledo Scale Co.

SHOWER BATHS AND CABINETS.
Crane Co.
Mills Co.
Sanymetal Products Co.

SHUTTLES.
Crompton & Knowles Loom Works.
Draper Corporation.
Jordan Mfg. Co.
Shambow Shuttle Co.
U S Robbin & Shuttle Co.
Williams Co., J. H.

SINGEING MACHINERY.
Butterworth & Sons Co., H. W.
Phila. Drying Machine Co.
Textile Finishing Machinery Co., The.

SITES FOR FACTORIES.
(See Industrial Sites.)

SIZE BOX TEMPERATURE CONTROLLER.
Bristol Co.
Foxboro Co., Inc., The.

SIZE KETTLES AND TANKS.
(See Bleaching Kiers or Tanks.)

SIZING AND FINISHING COMPOUNDS.
(See Finishing and Sizing Materials.)

SKEWERS.
Jordan Mfg. Co.

SKYLIGHTS.
Dowman, George.
Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.

SLAG FOR CONCRETE.
Birmingham Slag Co.

SLASHERS AND SLASHER ROOM SUPPLIES.
Butterworth & Sons Co., H. W.
Cole Mfg. Co., R. D.
Howard & Bullough.
Mossberg Pressed Steel Corp.
Saco-Lowell Shops.
Textile Finishing Machinery Co., The.

SLASHER HOODS.
Cole Mfg. Co., R. D.

SLASHER TAPE.
(See Tapes—Slasher.)

SLATE ASPHALT ROOFING.
Barrett Co

SLIDING PARTITION HARDWARE.
Dowman, George.
Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.
Lyon Metallic Mfg. Co.
Manufacturing Equip. & Eng'g Co
Sanymetal Products Co.
Wagner Mfg. Co.

SLUBBERS.
Howard & Bullough.
Saco-Lowell Shops.
Whitin Machine Works.

SMOKE SCREENS.
Dowman George.

SMOKE STACKS.
Casey-Hedges Co.
Dowman Dozier Mfg. Co.
Walsh & Weidner Boiler Co.

SOAPS—TEXTILE.
Arnold Hoffman & Co.
Borne, Scrymser Co.
Ciba Co. Inc.
India Alkali Works.
Kali Mfg Co.
Lennig & Co., Chas.
Mathieson Alkali Works, Inc.
Rohm & Haas Co.
Sonneborn Sons, Inc., L.
Stein, Hall & Co.
United Chemical Products Corp
Warren Soap Mfg. Co.
Wolf & Co. Jacques.

SOFTENERS—COTTON.
(See Finishing & Sizing Materials.)

SOFTENERS—WATER.
(See Water Softeners.)

SOLDERLESS CONNECTORS—FRANKEL.
Westinghouse Elec. & Mfg. Co.

SOLOZONE.
Roessler & Hasslacher Chem. Co.

SOLVENTS.
(See Finishing.)

SPEEDERS.
Jordan Mfg Co.
Parker & Co Walter L.
U S Robbin & Shuttle Co.
Universal Steel & Rubber Co.

SPEED VARYING TRANSMISSION
Reeves Puller Co.

SPEEDOMETERS.
(See Counters.)

SPINDLES.
Draper Corporation.
Saco-Lowell Shops.
Southern Spindle & Flyer Co.
Vermont Spool & Bobbin Co.
Whitin Machine Works.

SPINNERS.
(See Yarn Manufacturers.)

SPINNING FRAMES.
American Machine Co., H. & B.
Crompton & Knowles Loom Works.
Howard & Bullough.
Saco-Lowell Shops.
Schaum & Uhlinger.
Saco-Lowell Shops.
Whitin Machine Works.

SPINNING RINGS.
Draper Corporation.
Fulton Supply Co.
Howard & Bullough.
Greist Mfg. Co.
Saco-Lowell Shops.
Whitin Machine Works.
Whitinsville Spinning Ring Co.

SPINNING TAPE SPECIALISTS.
American Textile Banding Co., Inc.
Barber Mfg. Co.

SPOOLING MACHINERY AND SUPPLIES.
Barber-Colman Co.
Draper Corporation.
Foster Mch. Co.
Mill Devices Co.
Proctor & Schwartz, Inc.
Saco-Lowell Shops.
Warp Compressing Mch. Co.
Whitin Machine Works.

SPOOLS AND SKEWERS.
Allen Co.
Fulton Supply Co.
Jordan Mfg. Co.
Lestershire Spool & Mfg. Co.
Mossberg Pressed Steel Corp.
Parker Co. Walter L.
Steel Heddle Mfg. Co.
Textile Rubber Co.
U S Robbin & Shuttle Co.
Vermont Spool & Bobbin Co.

SPRAYING DEVICE FOR PAINTING.
(See Paint Spray.)

SPRINKLER SYSTEMS.
American Moistening Co.

SPRINKLER TANKS.
(See Tanks, Towers, Etc.)

SPROCKETS.
Link-Belt Company.
Morse Chain Co.
Renold, Inc. Hans

STAMPS, STENCILS AND STENCIL MACHINES.
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

STAND PIPES.
(See Tanks.)

STARCH AND GUMS.
Arnold, Hoffman & Co.
Borne, Scrymser Co.
Benson & Lane.
Ciba Co.
Corn Products Refining Co.
Kali Mfg. Co.
Keever Starch Co.
Mathieson Alkali Works, Inc.
Metz Co., H. A.
Pennick & Ford, Ltd.
Sonneborn Sons, Inc., L.
Staley Co., A. E.
Stein, Hall & Co.
Warren Soap Co.

STEAM ENGINES.
(See Engines—Steam.)

STEAM PUMPS.
(See Pumps—Steam.)

STEAM SEPARATORS.
(See Separators.)

STEAM TRAPS.
(See Traps—Steam.)

STEEL (BARS, SHAPES, PLATES, SHEETS, ETC.
Pregeon & Son, Inc., Jos. T.

STEEL BUILDINGS.
Rogers & Carlough.
Dowman, George.
Maryland Metal Bldg. Co.

STEEL SASH.
(See Sash—Steel.)

STEEL SHELVING, DOORS, WINDOWS PARTITIONS, ETC.
Rogers & Carlough.
Dowman, George.
Dowman-Dozier Mfg. Co.
Linton & Sons Co. David
Manufacturing Equip. & Eng'g Co.
Sanymetal Products Co.
Truscon Steel Co.

STEELS (STRUCTURAL).
Dowman, George
Rogers & Carlough

STENCILS AND STENCIL PAPERS.
(See Stamps and Stencils.)

STENCIL BRUSHES.
(See Marking Pots and Brushes.

STENCIL CUTTING MACHINES
Atlanta Stamp & Stencil Wks.
Bradley Mfg. Co., A. J.
Dixie Seal & Stamp Co.

STICKS—PICKER.
(See Picker Sticks)

STOOLS.
(See Furniture—Mill.)

STOP WATCHES.
Bristol Co.

STOP MOTION.
Crompton & Knowles Loom Works.
Draper Corporation.
Eclipse Textile Devices, Inc.
Whitin Machine Works.
Whitman Mfg. Co.

STOKERS.
Westinghouse Elec. & Mfg. Co.

STORAGE RACKS.
(See Shelving.)

STRAPS (LUG, CHECK, HEEL, TUGGER, PICKER HARNESS, ETC.)
Atlanta Harness & Reed Co.
Bond Co., Chas.
Fulton Supply Co.
Hayes Loom Harness & Reed Co.
Jacobs Mfg. Co., E. H.
Garland Mfg. Co.

STRAPPING.
(See Leather Specialties or Check Straps.)

STREET PAVING.
McCrary Co., J. B.

STREET LIGHTING FIXTURES
General Elec. Co.
McCrary Co., J. B.
Westinghouse Elec. & Mfg. Co.

STRICKLES.
Howard Bros. Mfg. Co.

SULPHIDES.
(See Finishing & Sizing Materials.)

SULPHUROUS ACID GENERATOR.
Mecomb Machine Co.

SWEEPS.
(See Brushes.)

SWINGS (PLAYGROUND).
(See Playground Equipment.)

SUPPLIES—GENERAL MILL
Dodge Mfg Co
Fulton Supply Co.
Jenkins Bros.
Link-Belt Co.
Linkenheimer Co.
Morse Chain Co.
Rhoads & Sons, J. E.
Williams & Sons I B.

SUPPLIES (OFFICE).
(See Office Equipment.)

SWITCHES—KNIFE-ELECTRIC.
Fulton Supply Co.
General Electric Co.
Westinghouse Elec & Mfg. Co.

SWITCHBOARDS—PANEL.
General Electric Co
Westinghouse Elec & Mfg. Co.

SYSTEMS (BUSINESS).
Frost & Frost

TABLES (METAL).
(See Furniture.)

TAPES—MILL.
Linton's Sons Co., David
Manufacturing Equip & Eng'g Co
Sanymetal Products Co.

TACHOMETERS (RECORDING AND INDICATING).
Bristol Co
Foxboro Co., Inc., The.
Roe Co.

TALLOW.
(See Finishing Machinery.)

TANKS (ELEVATED).
Casey-Hedges Co.
Cole Mfg Co., R. D.
Dowman-Dozier Mfg. Co.
Godfrey Conveyor Co.
Lombard Iron Works.
Walsh & Weidner Boiler Co
Woolford Wood Tank Co., G.

TANKS (SPRINKLER).
Cole Mfg. Co. R D.
Lombard Iron Works.
Woolford Wood Tank Co. G.

TANKS (STEEL STORAGE).
American Oil Pump & Tank Co.
Dowman-Dozier Mfg. Co.
Cole Mfg. Co R D
Godfrey Conveyor Co
Lombard Iron Works.
Walsh & Weidner Boiler Co.

TANKS (SEPTIC).
Davis Septic Tank & Eng. Co.

TANKS (WOODEN).
Hightower Box & Tank Co.
Philadelphia Dyeing Mchry. Co
Proctor & Schwartz Inc.
Textile Finishing Mchry. Co.
Woolford Wood Tank Co., G.

TAPE LOOMS—COTTON.
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Fletcher Works.
Schaum & Uhlinger.

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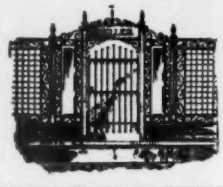

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American Textile Banding Co., Inc.
Barber Mfg. Co.
Weimar Brothers.

TAPES—SPINNING AND TWISTING.
Barber Mfg. Co.

TAPE MAKING MACHINES.
(See Bandage and Tape Machinery.)

TAPIOCA FLOUR.
Stein, Hall & Co.

TARPAULINS.
Smith Mfg. Co.

TAX SERVICE.
Ernst & Ernst.

TELEPHONE—CALLING SYSTEM.
Carter Electric Co.
General Electric Co.

TEMPERATURE REGULATORS.
Bristol Co.
Carrier Eng. Corp.
Foxboro Co., Inc., The.
General Electric Co.
Parks-Cramer Co.
Taylor Instrument Co.

TEMPLES.
Draper Corporation.

TENTS (ALL KINDS).
Smith Mfg. Co.

TENTERS.
Butterworth & Sons Co., The
Textile Finishing Mach. Co.

TENTER HOUSING & RECONSTRUCTING SYSTEM.
Proctor & Schwartz, Inc.

TENTER FRAME DRYERS.
Sturtevant Co., B. F.

TESTERS FOR YARN, FABRIC CORD, ROPE, RUBBER, WIRE, ETC.
Scott & Co., Henry L.

TEXTILE MACHINERY.
(See Cotton Mill Machinery.)

THEATRE EQUIPMENT.
Southern Theatre Equip. Co.

THERMOMETERS—ANGLE AND STRAIGHT STEM.
Bristol Co.
Foxboro Co., Inc., The.
Taylor Instrument Co.

THERMOMETERS—RECORDING AND INDEX.
Bristol Co.
Foxboro Co.
Taylor Instrument Co.

THERMOSTATS.
Bristol Co.
Foxboro Co.

THIN PLACE PREVENTERS.
Draper Corporation.

THREAD GUIDES.
Mitchell-Bissell Co.
Palmer Co., The I. E.

TILE ROOFING.
Richardson Co.

TIMBER.
(See Lumber.)

TIME CLOCKS.
(See Clocks.)

TIME RECORDERS.
Bristol Co.

TIES—BALING.
(See Bale Ties.)

TIRE FABRIC EQUIPMENT.
Fletcher Works.

TOILETS.
Crane Co.
Davis Septic Tank & Eng. Co.
Rundle-Spence Mfg. Co.
Vogel Co., Jos. A.

TOILETS (SEPTIC TANK).
Davis Septic Tank & Eng. Co.

TOILET PARTITIONS.
Dowman, George.
Dowman-Dozier Mfg. Co.
Lupton's Sons Co., David.
Manufacturing Equip. & Eng'g Co.
Mills Co.
Sanymetal Products Co.

TOOL CABINETS—STEEL.
Lupton's Sons Co., David.
Manufacturing Equip. & Eng'g Co.

TOOL STANDS—STEEL.
Lupton's Sons Co., David.
Mills Co.

TORCHES (BRAZING, CUTTING AND WELDING).
Bird-Potts Co., Inc.
Oxweld Acetylene Co.

TOOLS (MACHINE—HAND & ELECTRIC).
Fulton Supply Co.
Ryerson & Son, Inc., Jos. T.

TOP FLATS RECOVERED.
Howard Bros. Mfg. Co.

TOWERS.
(See Tanks—Elevated.)

TRANSMISSION—POWER.
(See Power Transmission Machinery.)

TRAPS—RETURN STEAM.
American Blower Co.
Morehead Mfg. Co.

TRAVELERS.
Fulton Supply Co.
Whitinsville Spinning Ring Co.

TRIPTODE.
U S Bobbin & Shuttle Co.

TROLLEYS & HOISTS.
Chisholm-Moore Mfg. Co.
Curtis Pneumatic Machy. Co.
Euclid Crane & Hoist Co.
Ryerson & Son, Inc., Jos. T.

TRUCKS—AUTO.
White Co.

TRUCKS, BASKETS, ETC.
Allen Co.
Lewis Co., G. B.
Lyon Metallic Mfg. Co.
Smith Mfg. Co.
Standard Fibre Co.
Washburn, Inc.

TRUCKS (BEAM).
Allen Co.

TRUCKS, INTER, ETC.
Allen Co.
Lewis Co., G. B.
Standard Fibre Co.
Washburn, Inc.

TRUCKS (WELDERS).
Oxweld Acetylene Co.

TUBES AND CONES.
Southern Novelty Co.

TUBS.
(See Tanks—Wooden.)

TUBING—METAL.
Dowman-Dozier Mfg. Co.
Youngstown Sheet & Tube Co.

TURBINES—HYDRAULIC.
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

TURBINES—STEAM.
Allis-Chalmers Mfg. Co.
American Blower Co.
General Electric Co.
Sturtevant Co., B. F.
Westinghouse Elec. & Mfg. Co.

TURBO UNDERGRATE BLOWERS.
American Blower Co.
Buckeye Blower Co.
Sturtevant Co., B. F.

TWISTING MACHINERY AND SUPPLIES.
Barber Mfg. Co.
Draper Corporation.
Foster Mch. Co.
Howard & Bullough.
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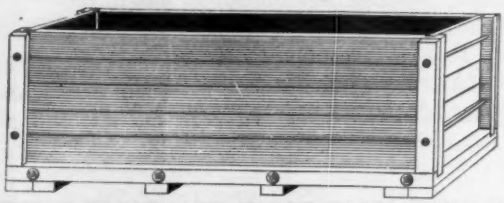

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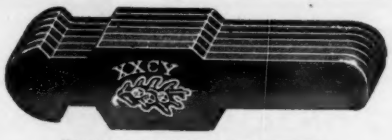

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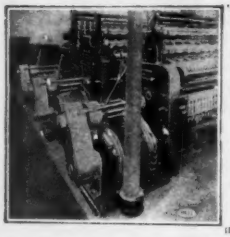

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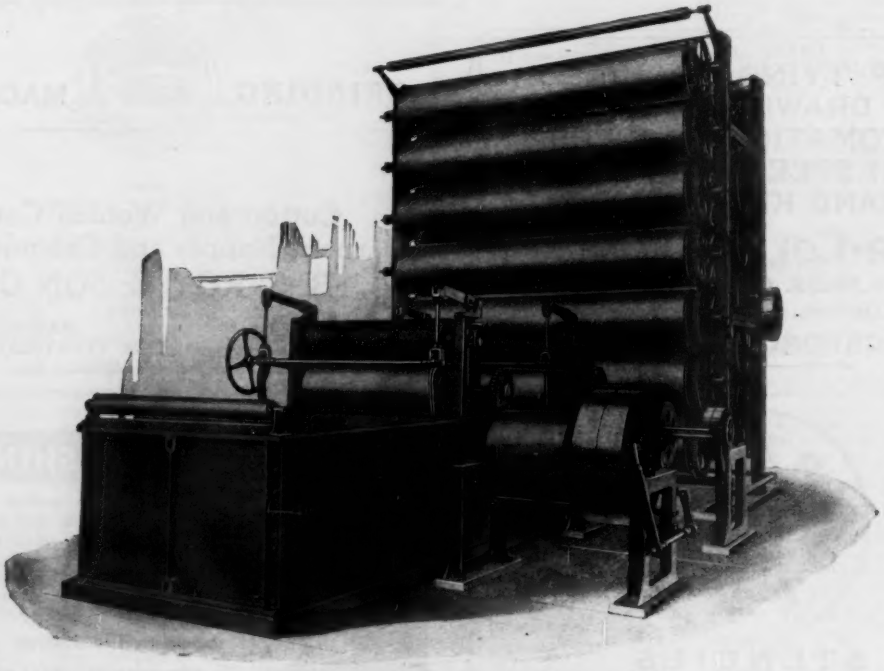

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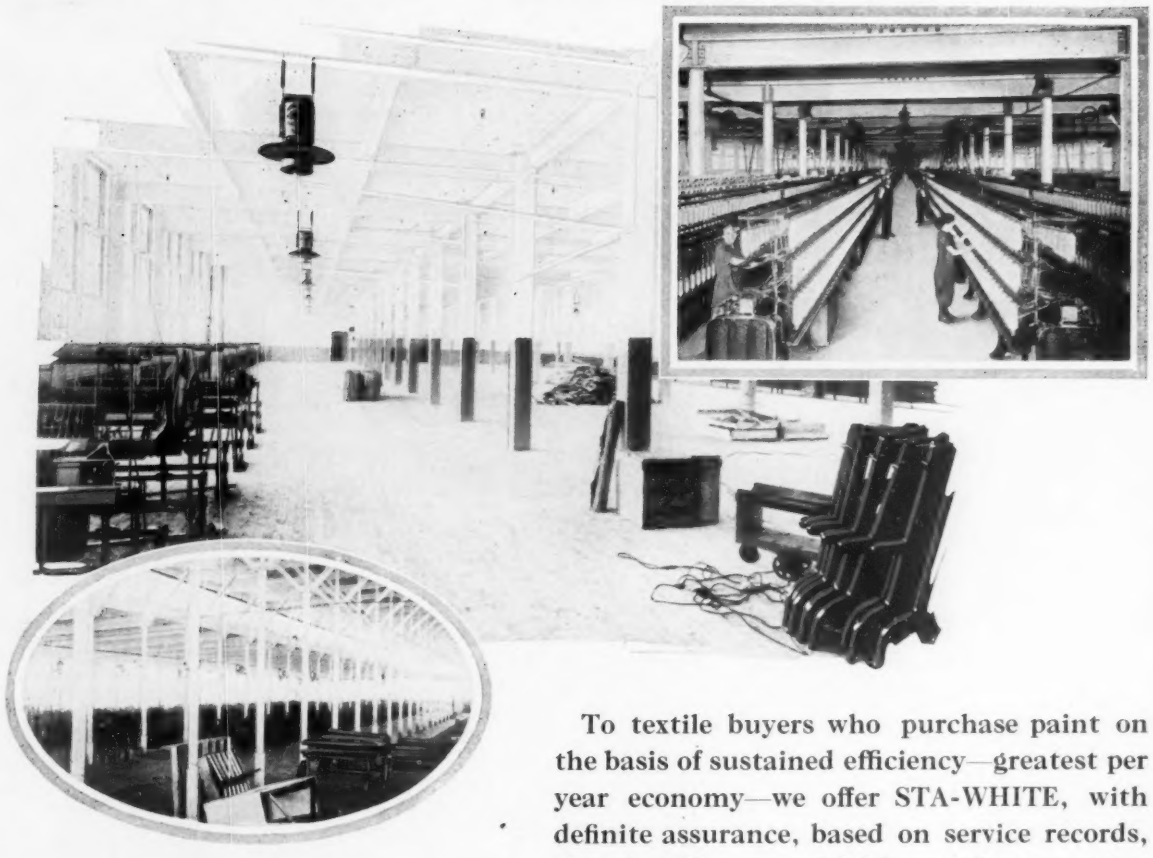

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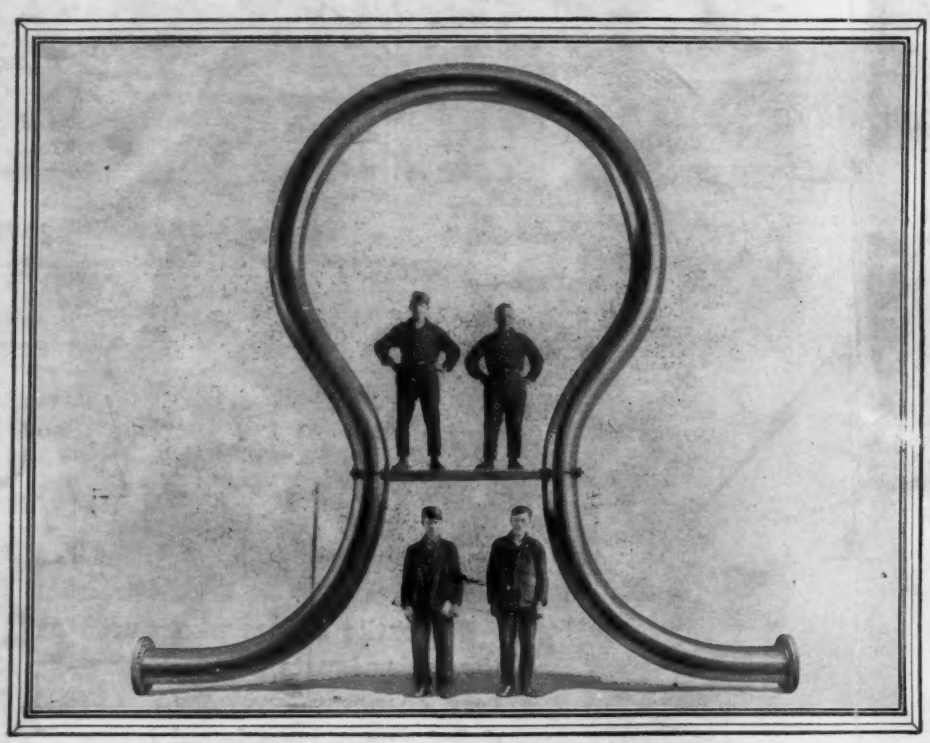

ALL PIPING REQUIREMENTS SUPPLIED

Crane standard proportions and regular Crane methods of construction, followed in the making of this huge 12-inch expansion bend, satisfied every requirement of the engineers of the Ford works at Toronto, where it will be used. The Crane plants are equipped to make bends of any size of pipe in any required shape. Crane's broad experience in planning piping equipment is always at your command to help you solve your particular problems.

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